The RUSSIAN FEDERATION

YEVGENY MASLOV

This book has been written by Candidate of Geographical Sciences Yevgeny Maslov of the Institute of Geography of the Academy of Science of the U.S.S.R. In brief outline it gives an over-all economic and geographic picture of the Russian Federation, which is the largest republic of the Soviet Union. Special attention is devoted to the natural and economic features of the different regions and industrial centres as well as to the distribution of the population. The author shows the republic's economic development under the great Seven-Year Plan, the changes in the distribution of industry and the growth of the economic importance of Siberia, which is a treasure-house of incalculable natural wealth.

For this book the author has drawn upon material that he had collected in the course of a long study of the republic's economy and geography, and also upon numerous literary sources.

The statistical data in the book refer to 1956-59.

Е. МАСЛОВ

РОССИЙСКАЯ ФЕДЕРАЦИЯ

ИЗДАТЕЛЬСТВО ЛИТЕРАТУРЫ НА ИНОСТРАННЫХ ЯЗЫКАХ · МОСКВА · 1960

RUSSIAN FEDERATION

YEVGENY MASLOV

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IN LIEU OF AN INTRODUCTION

The Russian Federation extends over a vast area of more than 17 million square kilometres from the Baltic to the Pacific and from the Arctic Ocean to the Black Sea. Territorially, this is as big as two countries such as the United States of America and thirty such as France. Fierce snow-storms rage in the north of the Russian Federation when in the south almond-trees bloom and the mimosa fills the air with its aroma. When Leningrad is wrapped in the inky darkness of night, the sun shines brightly over Vladivostok. An express train takes more than a week to cover the distance between these two cities.

The Russian Soviet Federative Socialist Republic (R.S.F.S.R.) is one of the 15 equal republics making up the Soviet Union. In territory (about three-fourths of the area of the Soviet Union) and in population it is the biggest of these republics, has the most developed economy, the richest natural resources and the greatest economic potential.

The R.S.F.S.R. is a multi-national federated state. The principle of the federated structure of the Russian Republic was established in 1918 by the *Declaration of the Rights of the Working and Exploited People*, which proclaimed the Russian Federative Republic with the purpose of "creating a really free, voluntary and, consequently, an all the more fuller and firmer alliance of the working classes of all the nations of Russia." As members of the federation there are in the R.S.F.S.R. 15 sovereign Soviet socialist republics which are national socialist states exercising state power on the basis of autonomy. Moreover, there are six autonomous regions en-

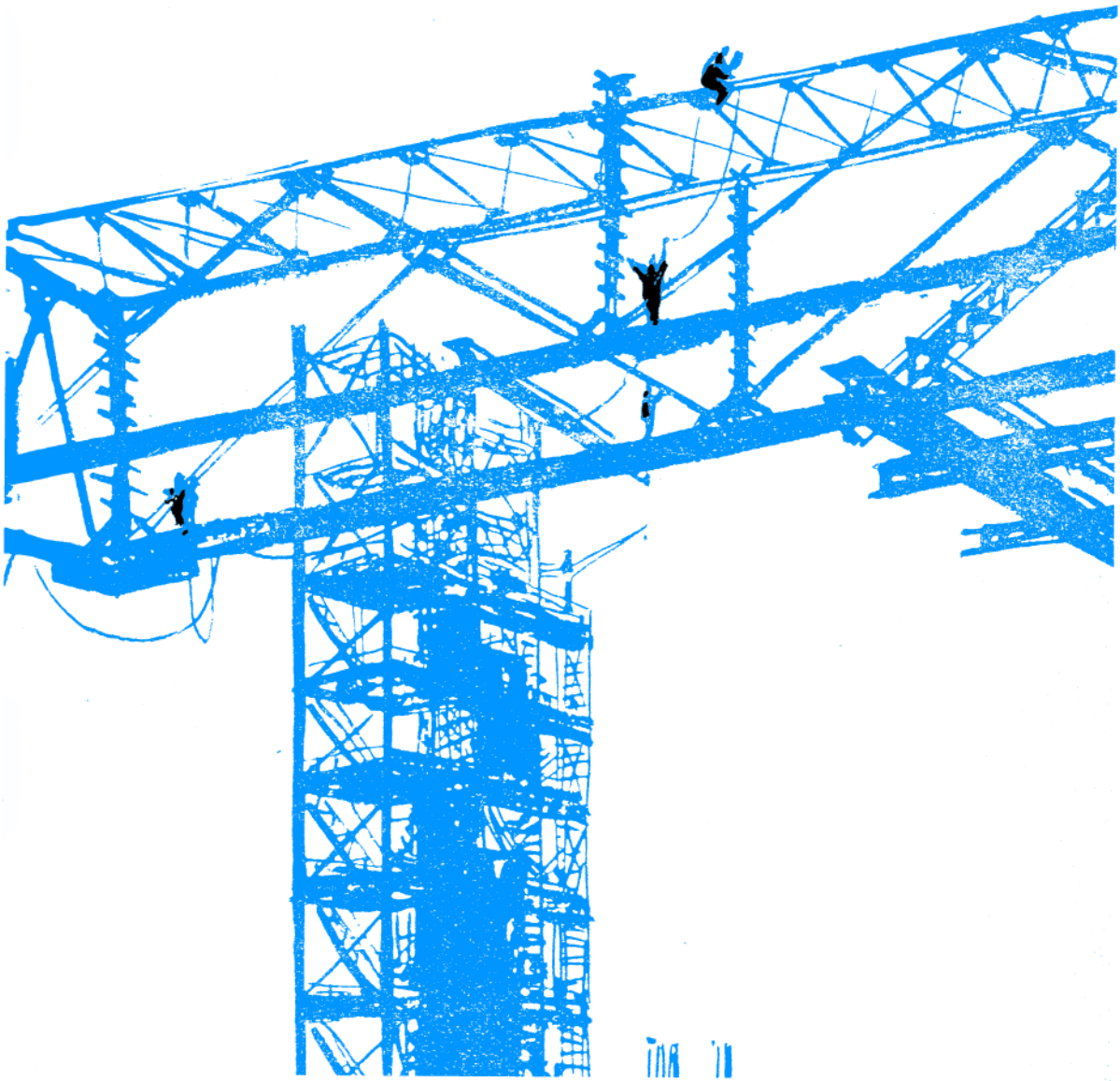
joying administrative national autonomy. The small peoples have national districts, of which there are 10. Under the national policy of the socialist state all the numerous nations inhabiting the Russian Federation have all the conditions for unhampered economic, political and cultural development. With the Russian people, they form a single, friendly family.

Where the population is predominantly Russian, the Federation is divided up into regions and territories. The difference between a territory and a region is that a territory encompasses a larger area and includes autonomous regions. There are national districts both in territories and regions. Altogether, the R.S.F.S.R. has 49 regions and 6 territories.

Tremendous economic changes have taken place during the years of socialist construction. Back in 1921, Vladimir Lenin wrote that "patriarchalism, semi-savagery and real savagery reign" in the endless spaces of Russia. Yet today new towns and major seats of industry and culture have sprung up in the boundless Russian Federation, in the once remote, undeveloped and economically and culturally backward regions of the North and Siberia. The formerly relatively developed areas of the European part of the Federation have also changed beyond recognition.

The Russian Federation has become the backbone of the economy of the multi-national Union of Soviet Socialist Republics. It accounts for two-thirds of the Soviet Union's industrial output, including half of the cast iron, nearly 60 per cent of the steel and coal, more than three-fourths of the oil, two-thirds of the electric power, 92 per cent of the automobiles and 62 per cent of the tractors produced in the country. It has nearly 60 per cent of all the crop area in the U.S.S.R.

TRANSFORMATION of RUSSIA



BRIEFLY ABOUT THE PAST

Let us look back and see what Soviet Russia inherited from the past and what the country's economic level was prior to the Revolution.

Russia took the path of capitalist development much later than the other European countries. The Tatar yoke alone held up the country's progress for 250 years. While in Europe feudalism was a thing of the past long ago, Russia abolished serfdom only in 1861.

Although the abolition of serfdom did help to advance tsarist Russia's economy, she continued to be one of the most backward countries in the system of world capitalist economy.

The very structure of her industry was eloquent testimony to this backwardness. The food and light industries were strikingly predominant. For example, in the total volume of industrial output in 1913, the share of the iron and steel industry amounted to eight per cent, of the fuel industry—seven per cent, while the textile and food industries contributed 55 per cent. That same year, per capita consumption of cast iron was eight times less than in Germany, four times less than in France and 11 times less than in the U.S.A. Russia also lagged behind the leading capitalist countries in per capita consumption of steel, coal and, especially, electric power.

Heavy industry, the engineering industry, in particular, was underdeveloped. This made imports vitally necessary and placed Russia in a position of dependence on foreign capital.

The abnormal distribution of the productive forces was another feature of Russia's capitalist development. About three-quarters of the industry was concentrated in the central regions of the European part of Russia—Moscow, Ivanovo and Petersburg—and in the South. The vast eastern regions had only a little more than 11 per cent of the country's industry. Moreover, the major industrial areas did not have their own raw-material resources and depended almost entirely on supplies from other areas. The centre was a metropolis which received its food-stuffs, fuel and raw materials from the outskirts. From there the finished products were sent to other areas. The tsarist government kept the outskirts in the position of colonies producing raw materials and prevented them from building up their own processing industry.

In the 18th and early 19th centuries, the Urals had the biggest mining and iron and steel industry. But the rapid expansion of these industries in the south of Russia at the close of the 19th century relegated the Urals to second place.

In spite of this industrial development, Russia as a whole remained a typically agrarian country. More than 86 per cent of the population were engaged in farming.

Agriculture with land cultivation as its main feature was at a low level. The technique was of the most primitive kind: the wooden plough, the wooden harrow and the three-field system of soil cultivation. More than half the land was in the hands of the landlords and the kulaks. The millions of petty and middle peasant households had a little under half the land but they produced three times less marketable grain than the landlords. The main agricultural regions were given over to grain. Industrial and fodder crops were sown on very small areas. Animal-breeding was also poorly developed.

Most of the population—the many millions of peasants—lived in constant penury. The landlords, kulaks and middleman-buyers as well as the heavy state taxes ruined the peasants, deprived them of land and forced them to seek employment in towns. From

time to time, famine struck territories inhabited by millions of people.

That was the economic situation in the country on the eve of World War I and the Revolution.

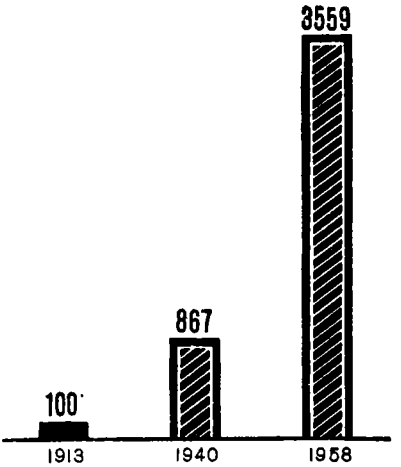
INDUSTRIALIZATION

The Great October Socialist Revolution smashed capitalism, tore the means of production—factories, plants, land, railways, banks—away from the bourgeoisie and made them the property of the whole people.

Immediately after the October Revolution of 1917, the Communist Party outlined a far-reaching plan of transforming Russia. The task was to convert a backward, agrarian country into a great industrial power. That entailed rapid expansion of the large-scale heavy industry and the reorganization of agriculture along new, socialist lines, i.e., its transformation from petty farming and small-scale commodity production to large-scale, mechanized collective farming. This was no easy task in a country that had been ravaged by Civil War and foreign intervention. But the workers and peasants were not daunted by the difficulties. The country's socialist industrialization, the collectivization of agriculture, and a cultural revolution were carried out within a historically short space of time.

Electrification was of immense importance in creating an industrial base. A plan of the electrification of Russia, which played an important role in developing the economy of the Russian Federation and of the Soviet Union as a whole, was drawn up on the initiative of Vladimir Lenin, the founder of the Soviet state. Lenin called this plan the second programme of the Communist Party. He underlined the importance of electrification with the words: "Communism is Soviet power plus the electrification of the whole country."

Industrialization led to a change in the country's economic structure. In the total output of the national economy (in the Soviet Union as a whole), the share of industry grew from 42 per cent in 1913 to 77.4 per cent in 1937. Industry expanded at a speed the



Growth of total output through 1913-1957 (in per cent of 1913)

world never knew before. For example, by 1955, total industrial output in the U.S.S.R. was more than 20 times higher than in 1929, while in all the capitalist countries output rose less than two-fold within the same period.

If we take only 11 pre-war years (from 1930 to 1940) and ten post-war years (from 1947 to 1956), we shall find that in 21 years of peaceful development, the annual increase in Soviet industrial output was 17 per cent, while in the U.S.A. it was 2.9 per cent, in Britain 3.3 per cent, and in France 2.7 per cent. Thus, Soviet rates of industrial growth are five-six times faster than in the leading capitalist countries. The result of this rapid growth was that in 1956 industrial output was 42 times higher than in 1917, the output of the heavy industry increasing more than 50-fold.

The planned system of socialized production was an important factor making for the steady and rapid advance of socialist economy. Planned development of the national economy is an economic law of socialism, and when economic life is of a planned character, there is constant harmony in the development of socialized production, a harmony that is consciously upheld by society. Russia was the first country in the world to give rise to this law and it was the result of the socialization of the means of production when capitalism and its law of competition and anarchy of production ceased to exist.

When the Communist Party embarked upon socialist construction, one of the first tasks it set itself was to do away with the uneven distribution of the productive forces. Industry had to be brought closer to sources of raw materials, fuel and the consumer, and the economic and cultural development of the former backward national

areas had to be accelerated. At the same time, over-all development of the economic regions and a correct division of labour between them had to be organized.

The Russian Federation helped the other Soviet Republics to promote their economy and culture. The old industrial regions with their developed engineering industry became the source of industrialization. Industry—mining, extracting and processing—began to make rapid strides in the formerly backward national regions as well.

In order to bring industry closer to the sources of raw materials, practical steps were taken to move it to the East, particularly to the Urals and Siberia, where thousands of factories and plants were built. The giant Urals-Kuznetsk Works sprang up on the basis of the coking coals of Western Siberia and the iron ore of the Urals. A huge textile centre was set up in Western Siberia (Barnaul, Omsk and Novosibirsk) to process Central-Asian cotton and that sharply reduced the unpractical transportation of cotton over the enormous distance from Central Asia to the central areas of the European part of the country, where textile mills were concentrated. Moreover, that made it easier to reach the consumer. New centres of the non-ferrous metals (Stalinsk), engineering (Novosibirsk, Omsk, Barnaul and other towns) and chemical (Kemerovo) industries were built in Siberia.

The establishment of heavy industry centres in Siberia, the Urals and other eastern regions of Russia was of immense importance for the country's defensive capacity.

One of the cardinal results of industrialization was that the country's economic independence was strengthened and it was freed from dependence on foreign powers. Thanks to the growth of industries such as ferrous metallurgy, the chemical industry and farming machines, and the creation of a number of formerly non-existent industries (tractor, automobile, aircraft), the Soviet Union found itself in a position to stop the import of many items. Machine imports fell drastically.

During the years of Russia's socialist transformation, industrial development was accompanied by a fundamental reorganization of agriculture. One of the gains of the October Revolution was that

private ownership of land was abolished. The land became the property of the people and that gave rise to conditions allowing for collectivization, for the conversion of the petty, scattered peasant economies into large-scale, socialist farms based on collective labour and the utilization of up-to-date machinery. Dwelling on the importance of machinery in the organization of a socialist agriculture, Vladimir Lenin said in 1919: "If, tomorrow, we could supply 100,000 first-class tractors, supply them with fuel, provide them with drivers (you know very well that at present this is sheer fantasy), the middle peasant would say, 'I am for the commune' (i.e., for communism)."

But what seemed fantasy in the years when the country's transformation was first started became reality 15-20 years later. Development of the heavy industry allowed agriculture to be widely mechanized and by 1940 the number of tractors in the Russian Federation (in terms of 15 h.p. units) exceeded 460,000 (throughout the U.S.S.R. there were 683,000 tractors), while the number of grain combines rose to 129,000 (there were 181,000 of these machines in the Soviet Union as a whole). Mechanization made agriculture more productive and increased its output of marketable surpluses. This was furthered by the introduction of advanced agrotechniques, the application of organic and mineral fertilizers, and the implementation of a correct system of crop rotation and irrigation in droughty regions. Greater output of farm produce was also facilitated by the extension of the crop areas. In the R.S.F.S.R., the crop areas increased from 70 million hectares in 1913 to nearly 92 million hectares in 1940. Essential changes took place in the pattern of land cultivation: industrial and fodder crops as well as vegetables began to occupy considerably greater space. Extension of the area under fodder grasses stimulated the growth and productivity of animal-breeding. Progress in agriculture led to the formation of a reliable raw-material base for the food and light industries.

Further development was halted by the Second World War, when tremendous losses were inflicted upon the economy of Soviet Russia.

Rehabilitation was started immediately after the war ended. In the R.S.F.S.R., more than 3,000 big and several thousand small in-

industrial enterprises were either restored or built anew during the period of the first post-war five-year plan (1946-50). At the close of that five-year plan, total industrial output in the Russian Federation surpassed the pre-war, 1940, level by more than 70 per cent. Extensive restoration was carried out in agriculture as well.

As a result of further economic progress, the Russian Federation overtook the most highly developed countries of Europe and Asia for the volume of output of the major industries. The R.S.F.S.R. is ahead of Britain, France, the Federal Republic of Germany and Japan in the production of coal, steel, electric power and cotton textiles. Of these countries, the Federal Republic of Germany alone is on a level with Russia in the output of pig iron.

At present, the chief economic task of the Soviet Union, and, consequently, of the Russian Federation, is to utilize the advantages of the socialist system of economy and overtake and surpass the leading capitalist countries in the economic field (in per capita output) in the immediate future. The following figures illustrate the achievements that have been scored in this direction. By 1955, Soviet per capita output rose above the 1913 level: coal—eight times, pig iron and oil—5.5 times, steel—7.6 times, cement—ten times, and electric power—61 times.

Today, as a result of far-reaching transformations, the Soviet Union has entered a new and extremely important period of its development, a period marked by the extensive building of a communist society. The decisive stage has been reached in the peaceful competition with the capitalist world, when the historic task of overtaking and surpassing the advanced capitalist countries in per capita output must be carried out in practice.

A seven-year plan of economic development for 1959-65, which is part of the programme of communist construction for the next 15 years, has been drawn up. The cardinal target of this plan is to secure a further steep rise in all branches of economy through priority development of the heavy industry and the strengthening of the country's economic potential, and on that basis to effect a further considerable enhancement of the standard of living.

FROM THE BALTIC TO THE PACIFIC

The Russian Federation lies in two parts of the world, occupying the eastern part of Europe and northern part of Asia. Its huge territory becomes strikingly manifest by the unusual contrasts of nature. Russia encompasses the eternal ice of the Arctic, the subtropical shores of southern seas, the enormous steppes of boundless plains and giant ranges of mountains towering into the clouds, dense taigas and deserts with shifting sands.

The Urals form a dividing line between the European and Asian parts of the R.S.F.S.R. West of the Urals lies the East-European Plain that occupies most of Eastern Europe. In the south, the plains of European Russia are bounded by the Caucasus.

East of the Urals we find the huge West-Siberian Lowland that terminates in the south-east at the Altai Mountains. Beyond the Yenisei this lowland gives way to tall plateaux and mountains which reach to the very shores of the Pacific.

This shows that the R.S.F.S.R. has a varied relief with plains predominating in the west and centre and mountain ranges in the east.

Most of Russia slopes towards the Arctic Ocean and that is why most of the big rivers flow in that direction. These include such huge arteries as the Lena, the Yenisei and the Ob in Siberia, and the Pechora and the Northern Dvina in European Russia. The great Volga carries its waters southward, to the Caspian. This extensive network of rivers is of major importance as a means of transportation. The rivers flowing to the Arctic Ocean were widely developed as waterways particularly after the opening of the Northern Sea Route, a navigable lane extending along the Soviet Union's northern coast over the seas of the Arctic Ocean. The Volga's importance as a waterway increased when the Volga-Don Canal was built. In the Russian Federation rivers play an immense role as sources of energy.

The Russian Federation is washed by the waters of three oceans and thirteen seas: in the north—by the seas of the Arctic Ocean (Barents, White, Kara, Laptev, East-Siberian and Chukotsk); in the east—by the seas of the Pacific (Bering, Okhotsk and Japan); in

Chief Rivers of the Russian Federation

River	Outlet	Length (in km.)	Area of basin (in thousand sq.km.)
Yenisei	Kara Sea	5,940[1]	2,600
Ob	Kara Sea	5,570[2]	2,930
Amur	Sea of Okhotsk	4,510[3]	2,050
Lena	Laptev Sea	4,270	2,420
Volga	Caspian Sea	3,690	1,380
Kolyma	East-Siberian Sea	2,600	644
Olenyok	Laptev Sea	2,415	246
Don	Sea of Azov	1,970	422
Pechora	Barents Sea	1,790	327
Indigirka	East-Siberian Sea	1,790	360
Khatanga	Laptev Sea	1,510	346
Northern Dvina	White Sea	1,310	360
Anadyr	Bering Sea	1,170	200
Kuban	Sea of Azov	970	61
Terek	Caspian Sea	600	44
Neva	Baltic Sea	74	282

the west and south—by the seas of the Atlantic (Baltic, Black and Azov). In the south there is also the inland Caspian Sea. Nearly 250 species of food-fish are yielded by the seas, rivers and lakes of the Russian Federation.

With such a vast territory, the Russian Federation naturally has different climatic belts. They range from the Arctic to the subtropical. Most of Russia, however, is in the temperate zone.

Oceans and seas influence the climate not only along the seaboard. The warm Gulfstream flows into the Arctic Ocean through the Barents Sea and at the same time there is a cold stream flowing westward from the north-eastern shores of Siberia to Greenland and merging with the northern part of the Atlantic Ocean. The course of this stream was shown by the "North Pole-1" and subsequent Soviet Arctic drifting stations.

The influence of the Arctic Ocean, which affects the Eurasian continent along a broad front, is felt to a varying extent throughout the

[1] From the source of the Selenga.
[2] From the source of the Irtysh.
[3] From the source of the Shilka.

whole country. However, the warm stream of the Atlantic Ocean mildens the climate of the north-western part of Russia with the result that the mean January temperature in Leningrad is the same as in Astrakhan.

In the Far East, the situation is different. There is nothing to save that area from the influence of the cold streams of air from the Arctic. For that reason, in Vladivostok, which is on the same latitude as Sochi, the mean January temperature is three degrees Centigrade lower than in Moscow.

There is a distinct difference between the climate of the European and the Asian parts of the Russian Federation. In the latter, the climate is sharply continental with a precipitation of 300-400 mm., or almost half the precipitation in the European territory (600-700 mm.), colder winters (40-50°C. below zero) and a larger number of sunny days. In the European part of Russia, the winters are marked by predominantly cloudy weather, but the climate is much milder and damper.

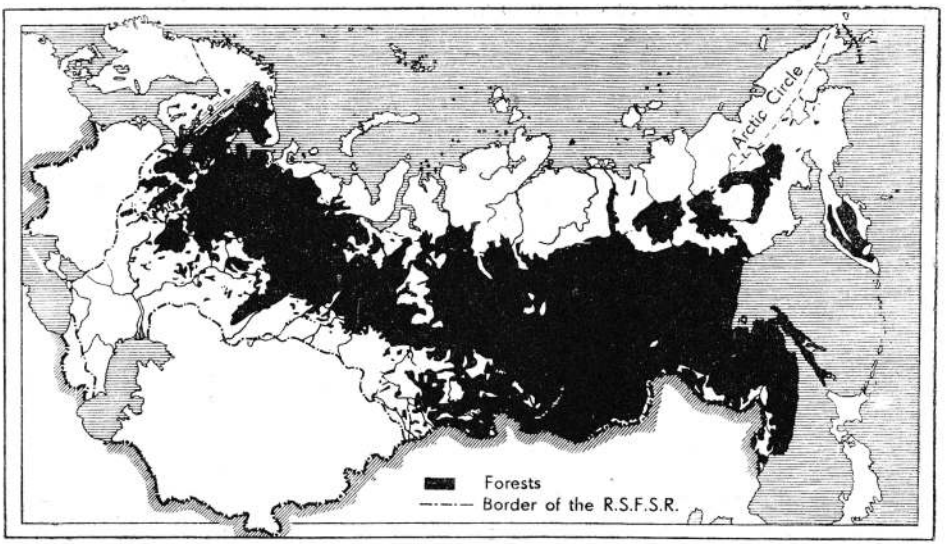
The dissimilarity in climate is also seen along one and the same meridian: the Extreme North of the European part of Russia has an Arctic climate, Central Russia—a temperate climate, and the Extreme South, along the Black Sea—a humid, subtropical climate.

The difference in soils and plants is most marked from north to south. The whole of Russia is intersected by four zones: tundra, forest, forest-steppe and steppe.

The tundra extends along the shore of the Arctic Ocean. Overgrown with moss and lichens, it is a pastureland for reindeer. In winter, the thin blanket of snow affords the soil little protection from the frost, and eternal congelation reigns throughout the tundra. In spite of that, the soil is cultivated. Polar farming has taken shape with its own methods of improving and developing land and growing crops.

South of the tundra, in the temperate climate belt, lies the forest zone.

The Russian Federation has 92 per cent of the Soviet Union's and nearly a quarter of the world's forests. The forest areas make up 38 per cent of the republic's territory. In the European part of the country there is mainly a mixed forest consisting principally of



Distribution of Forests in the R.S.F.S.R.

fir, pine, oak and birch; in the Asian part—a coniferous forest of Siberian fir, pine, larch, silver fir and cedar. Deciduous forests predominate in the southern regions.

Russia's forests are of tremendous economic importance. Timber is used extensively within the country and is a major item of export.

Southwards, the forest zone gives way to a forest-steppe, which in its turn is superseded by a steppeland. These zones abound in fertile black soil (chernozem) which is unequalled for farming. In the R.S.F.S.R., black soils occupy more than a million and a half square kilometres, representing nearly 40 per cent of the world's total. Huge tracts of fertile black soil with a high humus content stretch in the central and southern parts of the Russian Plain and in the West-Siberian Lowland. Southwards, the humus content as a rule becomes lower. The Azov area and the steppes west of the Caucasus are covered with a special kind of black soil called *predkavkazsky* which is nearly as thick and fertile as the chernozem of the central

regions. Bumper harvests of wheat, maize, industrial and other crops are grown on this soil.

Turf-podzol and mountain-podzol soils that have developed in areas with large forests are especially widespread in the R.S.F.S.R. These soils cover a little less than half the territory of the Russian Federation, making up nearly half of the total in the world.

Chestnut soils with salt marshes and sandy wastes prevail in the steppe zone. The droughty semi-desert steppes of the Caspian area, where the soil is almost unsuitable for farming, are used as winter pastures. In the summer livestock are driven to the sub-alpine meadows on the slopes of the Caucasus. The varied soil and climatic conditions make it possible to develop farming throughout the Russian Federation.

GEOLOGICAL MAP WITHOUT "WHITE SPOTS"

In Russia, the bowels of the earth hold fabulous wealth. All the elements of Mendeleyev's periodic system are found in them.

Geological prospecting and tapping of Russia's mineral wealth has forged far ahead in the forty years of Soviet power. Hundreds of deposits of the most diverse minerals have been discovered, prospected and given over for industrial exploitation. Today, the Russian Federation and the Soviet Union as a whole occupy first place in the world for the size of the prospected reserves of iron, apatites, phosphorites, potassium salts and peat.

The geologist's pick rings in the great Siberian taiga, the steppes of the Russian Plain, on the slopes of the Altai Mountains and in the ravines of the Caucasus. Machinery has come to the assistance of geologists and prospectors. Enormous deposits of ore (particularly magnetite) have been discovered with the assistance of aircraft. Gravimetric, seismometric and other new methods of prospecting have been worked out and introduced; use is being made of isotope chemistry; and radio-prospecting is a matter of the immediate future.

Maxim Gorky, the eminent Russian writer, who closely followed the study and development of the country's natural resources, wrote: "The scientists investigating the bowels of the earth almost daily

discover tremendous deposits of coal, iron ore, and fertilizers that are needed to increase the fertility of our fields. As though conscious that the rightful, real and wise master has been born, the earth displays its treasures."

In the earth, minerals are distributed in conformity with natural laws, depending on the geological structure and origin of each section of the crust. These laws are reflected by the geological map. For the first time in history such a map of the territory of the Russian Federation has been drawn without "white spots." It facilitates study of the country's mineral resources.

We anticipate many geological discoveries which will give socialist economy greater raw-material resources than ever before.

The country already has the requisites for creating a mineral and raw-material base at the confluence of the Yenisei and the Lena (the "Siberian Platform" as geologists call it) and in the West-Siberian Lowland which would match the present-day industrial Urals in importance.

Speaking in the words of Lenin: "In our natural wealth, in our manpower resources, and in the splendid impetus which the great Revolution has given to the creative powers of the people, we have the material for the creation of a truly mighty and abundant Russia."

In order to achieve an all-round acceleration of economic development, the seven-year plan for 1959-65 envisages the priority expansion of heavy industries which contribute towards a rapid upsurge of the entire national economy. In addition to a quantitative growth of industrial output, this plan outlines qualitative changes in the structure of industry. High rates of growth will be combined with the necessary proportions in economic development. The fuel pattern will be basically reorganized, with special attention paid to the extraction and production of the most economic kinds of fuel—oil and gas. Output of ferrous and non-ferrous metals will be considerably increased and the chemical industry, chiefly the synthetic materials industry, will be developed at an accelerated pace. Much attention is being devoted to the country's further electrification, primarily through the construction of large thermal power stations and to the technical reconstruction of the railways, which will be sup-

plied with large numbers of electric and diesel locomotives. Agriculture and housing construction will make further headway. In the next few years great importance will be attached to drawing the country's rich natural resources into the economic turnover on an intensified scale, improving the distribution of the productive forces throughout the country and bringing industry closer to the sources of raw materials, fuel and the consumer regions. Particular attention is being given to the further development of the natural wealth in the eastern regions.

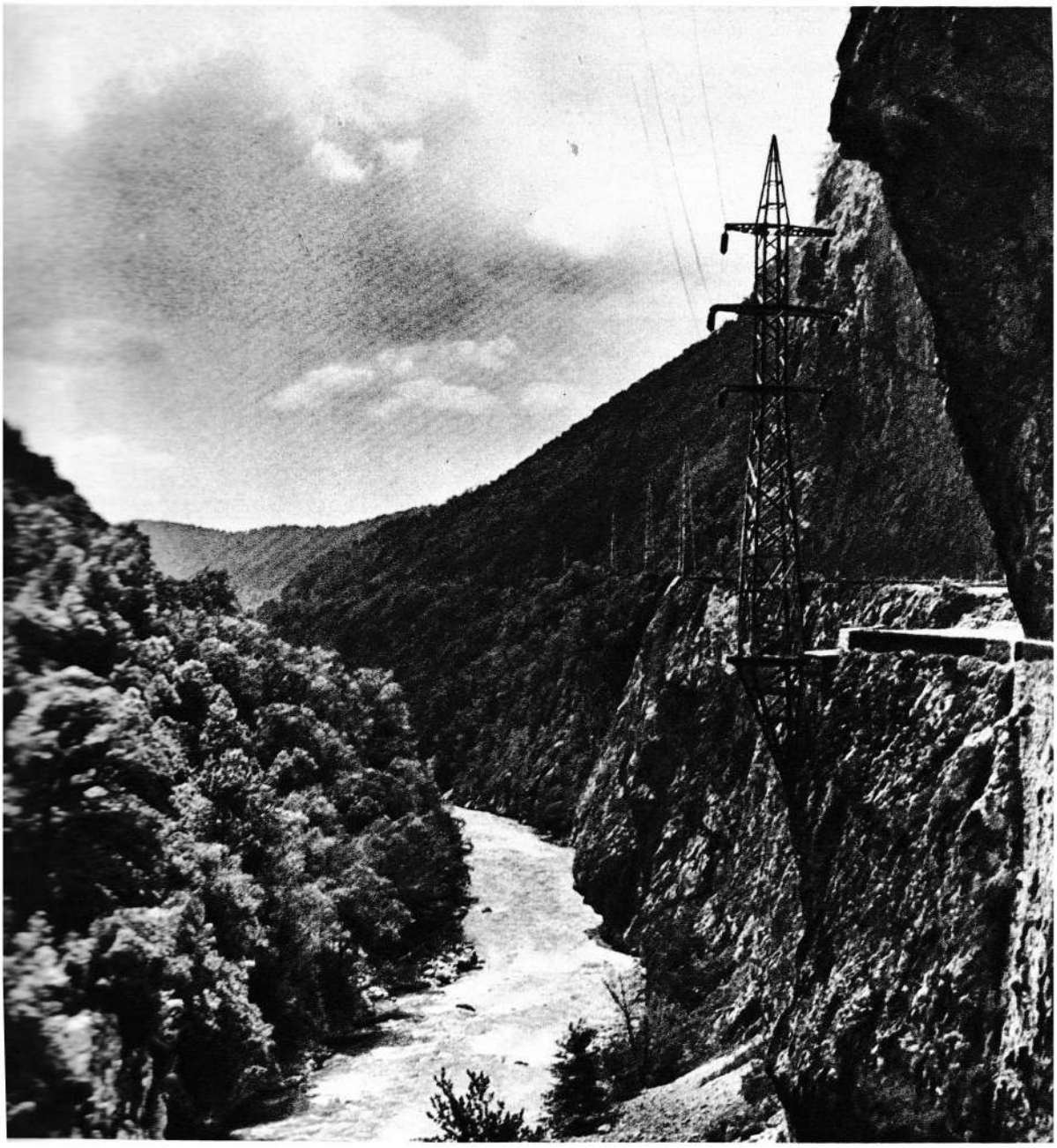
FUEL AND POWER

The country would never have achieved its high rates of economic development had it not had a big fuel and power industry. Fuel and power are the foundation of industrial progress and must therefore be ahead of the other branches of the national economy.

The Russian Federation has enough fuel to last it for many centuries. The power resources are particularly extensive. Suffice it to mention such huge mining areas as the Kuznetsk, Pechora, Cheremkhovo and Moscow basins, and the basin of the Donets, whose left wing thrusts into the R.S.F.S.R. The Pechora Basin was prospected in Soviet years, while the borders of the old coal basins—Donets, Kuznetsk and Moscow—have been considerably extended. The biggest reserve, however, will be the enormous coal deposits in the Asian part of the republic where mining is only just beginning. The R.S.F.S.R. has 90 per cent of the Soviet Union's coal, of which three-quarters are concentrated in Siberia. The outstanding coal-fields discovered in Soviet years include the immense Tunguska Coal Basin, the Lena Coal Basin in Yakutia, the South-Yakutian Basin with its high-grade coking coals, and the Kan-Achinsk Brown Coal Basin in Krasnoyarsk Territory.

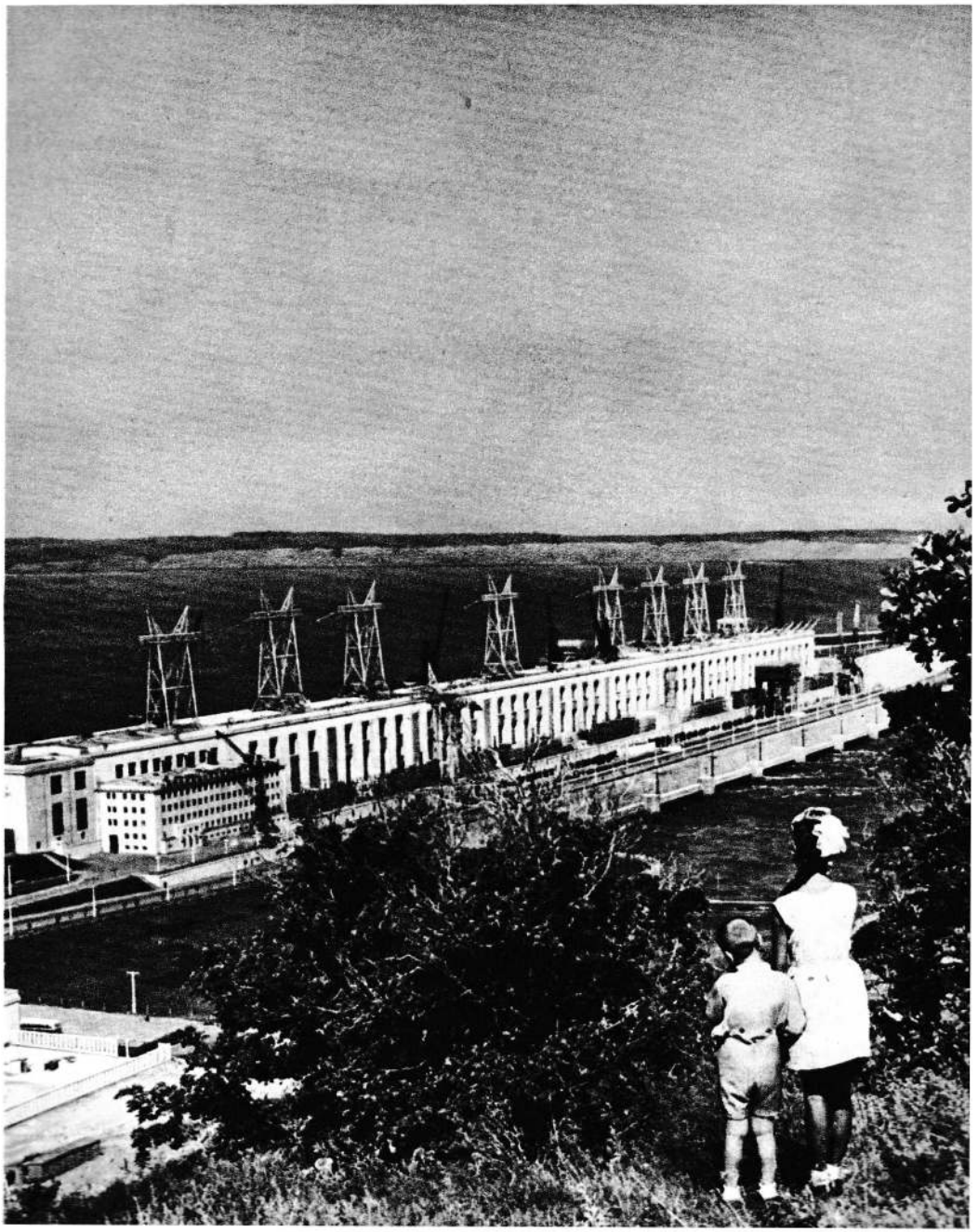
Prior to the Revolution it was estimated that Russia had a coal reserve of 230,000 million tons, but today this reserve is placed at 8,670,000 million tons.

The coal industry of the Russian Federation reached a high level of development in Soviet years, and output increased from six mil-



Mzymta River Valley, Krasnodar Territory, the Caucasus

Lenin Hydropower Station on the Volga

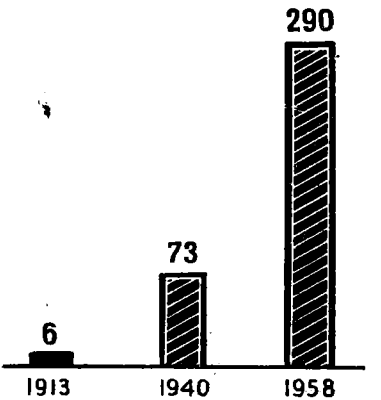


Harvesting wheat in the Kuban area

First atomic power station (built in 1954)

lion tons in 1913 (within the present borders of the republic) to 290 million tons in 1958.

In spite of the tremendous natural reserves of fuel, pre-revolutionary Russia met a considerable part of her requirements with imports.



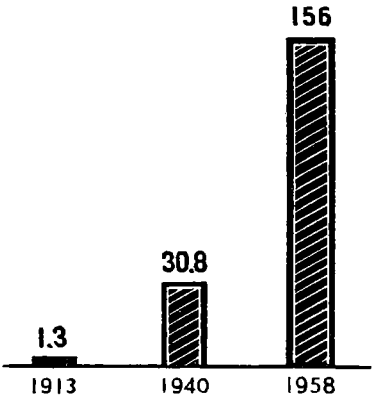
Coal output (million tons)

Formerly, 87 per cent of the mining industry was concentrated in the Donets Basin, but today the geography of coal-mining has changed radically. Extensive development is proceeding in the Kuznetsk, Cheremkhovo (in Siberia) and Pechora basins and in the coal-fields of the Soviet Far East. At the same time, output is being stepped up in the old coal regions.

The Russian Federation has plenty of oil. There are big oil deposits in the most diverse parts of the country—in the North Caucasus, in the North, on Sakhalin Island, in the Volga Area and in the Urals. Oil prospectors scored their biggest success when they discovered the extremely rich Volga-Urals oil-field, which has been named the Second Baku. Great reserves of oil have been found on the bed of the Caspian Sea, where it is now being extracted by means of inclined wells. Output has grown from 1,300,000 tons in 1913 to 88 million tons in 1958.

The oil industry is equipped with the most up-to-date Soviet-designed equipment. New methods of extraction worked out by Soviet scientists are being applied. Especially effective is the method of pumping water or gas into the oil layer, which greatly increases the discharge of oil from the wells. The network of pipes carrying crude oil to refineries and oil products to the consumer regions is being enlarged.

The growing demand for petrol is giving rise to the necessity of building cracking plants in many regions.



Power output (1,000 million kw-h.)

kilowatt hydropower station at Kuibyshev, the biggest in the world, was put in operation in August 1958. It took this station only two months to generate the amount of electricity that was generated by all the power stations of Russia in 1913.

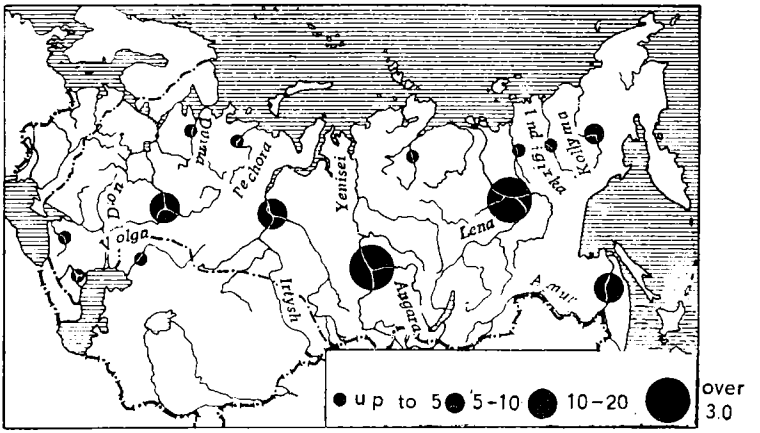
One of the principal targets of the seven-year plan for 1959-65 is the priority construction of thermal power stations operating on cheap coal, natural gas and mazout. This will step up the expansion of the power resources with the least capital investments and on a higher technical level. Extension of the capacities of the thermal power stations will permit cutting the estimated cost per kilowatt of the rated capacity of the stations to be built in 1959-65 by an average of 23 per cent compared with 1958.

Parallel with the commissioning of big thermal power stations, provision is made for completing the construction of several big hydropower stations and the building of other hydropower stations mainly in regions lacking fuel reserves.

Within the next seven years there will be a single power system in the European part of the R.S.F.S.R. and in Central Siberia, and the power systems in the North-West will be united.

The Russian Federation has unlimited water resources. It has 75 per cent of the 300-million-kilowatt capacity of the 1,500 large rivers in the Soviet Union. These resources are much greater than the reserves of water power in countries like the U.S.A., Canada, France and Japan.

The subjugation of the vast hydropower resources of the Volga, where a whole cascade of power stations is being built, has been started.



Mean Annual Power of Rivers (000,000 kw-h.)

The prospects of building power stations are particularly great in Siberia, which has more than half the Soviet Union's water-power potential. Power colossuses that have no equal in the world are being erected on the giant Siberian rivers.

There are plans for extensive work to harness the rivers of Siberia. Engineers are working on a problem which seems fantastic at first glance. This concerns channelling the Siberian rivers to the Central-Asian deserts where there is an acute shortage of water. This task cannot be carried out independently. It is only a component of the plan to create the world's biggest system of waterways that would link up all the seas in the country and the three oceans washing its shores, and would include 100,000 kilometres of railways and highways. According to the plan, a new river rising from the Ob and the Yenisei will flow southwards across the Tobol through the Turgai Gates and link up Siberia with Central Asia, the Caspian and the Aral seas.

A variant of this plan envisages the creation of two new latitudinal rivers, the Southern and the Northern, to supplement the present Siberian rivers flowing in a meridional direction. The South-Siberian River will unite the flow of the upper reaches of all the Siberian

rivers and direct it westward and further to the Aral-Caspian Lowland, where it will irrigate the desert and semi-desert regions of this area. The North-Siberian River will gather up the flow of the lower reaches of the Lena, the Yenisei and the polar rivers and direct it to the Lower Ob, where its energy will be used for superpowerful hydro-electric stations.

It is still not known how this grandiose task will be implemented, but the possibility of carrying it out is in the hands of Soviet people.

Colossal thermal energy in the shape of hot springs and steam gushers lies in the earth in the volcanic regions of the Kamchatka Peninsula, the Kuril Islands and the North Caucasus. These thermal resources will serve to develop geothermal power engineering.

Power engineering has entered a higher stage of its development.

The uses of nuclear energy for peaceful purposes are being extended. Nuclear power stations will be built chiefly where there is a shortage of local fuel, particularly in the central regions and in the Urals.

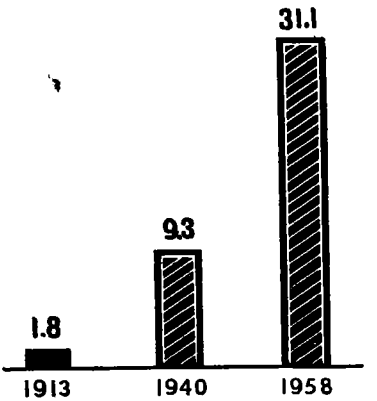
METALLURGY AND CHEMISTRY

The Soviet Union's main reserves of iron ore are concentrated in the Russian Federation. There are huge deposits in the Urals, the North-West, the central regions and Siberia. Virtually inexhaustible deposits of iron ore have been discovered in recent years in the Kursk-Belgorod region, the so-called Kursk Magnetic Anomaly. Geologists looking for oil have found extremely rich deposits of iron ore around Kolpashevo in Western Siberia. The R.S.F.S.R. also has great deposits of manganese ore. All this mineral wealth forms a powerful raw-material base for the development of the ferrous metals industry.

In the Russian Federation as a whole the output of pig iron has grown from 1,300,000 tons in 1913 to nearly 18,800,000 tons in 1958, while the output of steel has risen in the same period from 1,800,000 tons to 29,600,000 tons.

The ferrous metals industry expanded through the extension of the old iron and steel centres and the building of new factories, particularly in the eastern areas.

This industry is concentrated in three main areas: the Centre, the Urals and Western Siberia. At the moment the Urals is the republic's biggest producer of iron and steel. With the Urals as its base, a large-scale iron and steel industry has developed in the eastern areas, principally in Western Siberia. On the whole, the next 10-15 years will see Siberia becoming the biggest base of the ferrous metals industry in the Soviet Union.



Steel output (million tons)

The Russian Federation is also very rich in non-ferrous, rare and the rarest metals. Development of this wealth proved of tremendous importance for Soviet Russia's technical progress. As a result of extensive geological prospecting, the known reserves of copper, lead, tin, zinc, nickel, aluminium and magnesium have increased considerably. Rare elements such as cobalt, tantalum, niobium, radium, cesium and bismuth have also been discovered.

There are non-ferrous metals in many places in the R.S.F.S.R. The greatest deposits of copper ore are in the Urals, and of lead and zinc—in the Urals, the Altai, the North Caucasus, the Baikal area and Primorye Territory. Zinc and lead frequently occur in polymetallic ores together with silver, gold, copper and rare metals. Big deposits of copper, molybdenum and polymetallic ores have been brought to light in Eastern Siberia. Not long ago, copper and nickel were found within the Arctic Circle. In Siberia and in the Urals there are big gold-fields.

The non-ferrous metals industry has progressed by leaps and bounds on the basis of these deposits, especially in connection with the big demand for non-ferrous metals by industries such as electrical engineering, aircraft-building and automobile-and-tractor building. The country gets most of its rough copper from the Urals, lead

from the North Caucasus and the Soviet Far East, and zinc from the Urals, the North Caucasus and Western Siberia. Aluminium and nickel industries have been built up, while tin, mercury, antimony, cobalt, bismuth, gold, silver and platinum are mined on a big scale.

Geologists have recently found great deposits of diamonds in Yakutia, which lie deep in the Siberian taiga. Preparations are in full swing to organize a diamond industry there.

In the Russian Federation every effort is being made to accelerate the development of the chemical industry, particularly synthetic chemistry and the output of mineral fertilizers.

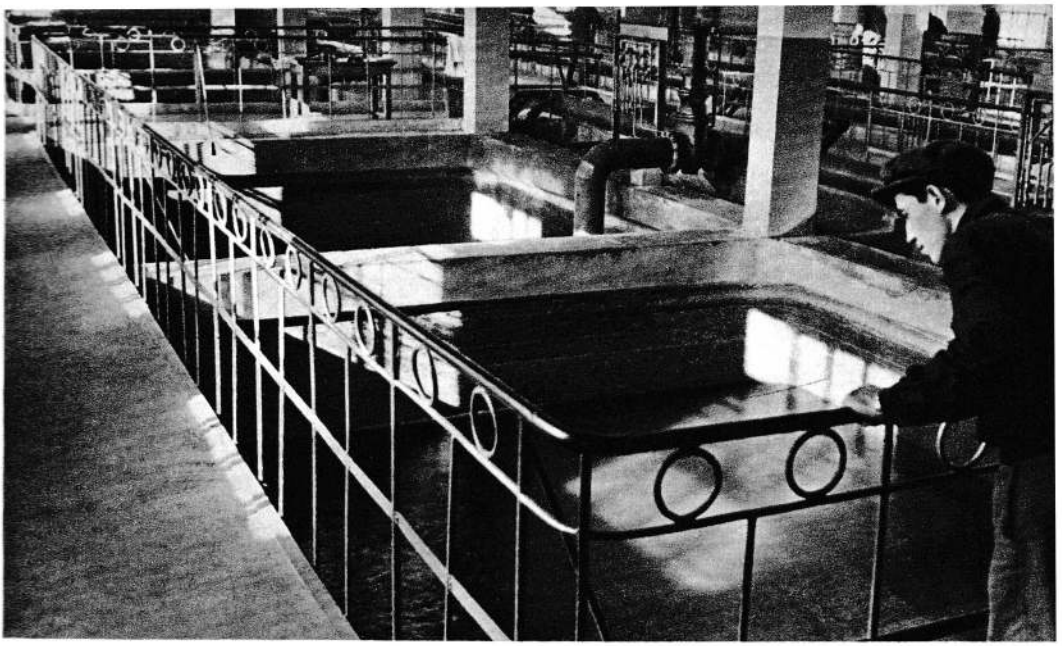
The products of synthetic chemistry (synthetic polymeric materials) are successfully replacing metals in machine-building and construction. Plastics can be used to supplant lead, copper, nickel and bronze. For example, the TU-104 jet airliner has 120,000 parts made of plastics.

The Russian Federation is rich in chemical raw materials. Apatites and phosphorites are the sources from which mineral fertilizers are obtained. A chemical industry has been built in the Kola Peninsula on the basis of apatite deposits and in Moscow Region on the basis of deposits of phosphorites. There are large deposits of iron disulphide (pyrite), a raw material for the production of sulphuric acid, in the Urals and Eastern Siberia. The reserves of common salt are inexhaustible. The biggest potassium and magnesium salt deposits are around Solikamsk in the Urals. A large part of the waste from the ferrous metals industry—coking gas and coke by-products—likewise serve as raw materials for the chemical industry. Oil gases and oil products from which synthetic rubber, alcohol, plastics and artificial fibre are produced are exceedingly important and promising raw materials.

Extension of the output of synthetic materials supplanting fibre, leather and fur sources is greatly augmenting the steadily growing stream of agricultural raw materials.

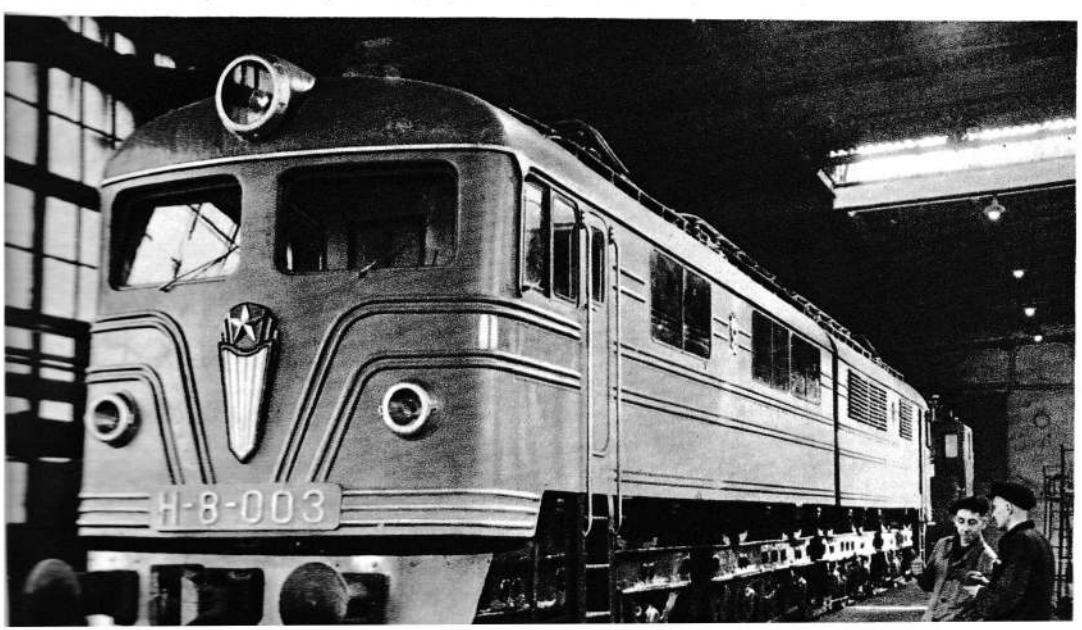
MACHINES AND BUILDING MATERIALS

Machine-building is the nucleus of the heavy industry, the main lever of the reconstruction of the national economy and the foundation of technical progress. Prior to the Revolution, half of Russia's machine-



Powerful water-purifying installation for trans-contour flooding of oil beds, Tatar Autonomous Republic

Electric locomotive of the Novocherkassk Works, Rostov Region



Pig department at a collective farm in Krasnodar Territory

Local fine-fleece sheep, Stavropol Territory

building enterprises were concentrated in the Moscow and Petersburg regions. These regions had almost three-quarters of the country's power machine-building industry, nearly the entire electrical engineering industry and approximately half the locomotive-building industry. The change in the geography of industry in Soviet times was accompanied by a redistribution of the machine-building industry. Today there are machine-building works throughout the country. To a large extent this was facilitated by the withdrawal of many enterprises from the Centre to the East during the Second World War.

Heavy machine-building gravitates towards the iron and steel bases (the Urals and Western Siberia); some branches of the machine-building industry which use high-grade metal are located where this metal is produced (the central regions); the farming machines industry is drawing closer to the consumers (North Caucasus, Volga Area, Western Siberia). Only a few years ago, the availability of cadres with production and technical experience was an important factor in the distribution of the so-called expert machine-building industry. For that reason, turbine-building was concentrated in Leningrad, and machine-tool-building—chiefly in Moscow and Gorky. Lately, however, enterprises of these industries have sprung up in other economic regions thanks to the growth there of the number of skilled workers. New machine-tool factories and enterprises of the power, transport and other branches of the machine-building industry are being built in Siberia and in the Urals.

In the Russian Federation, this industry is equipped with the best machinery modern engineering can provide. Automation and remote control are applied on a broad scale.

Industrial and town building could not have attained their present high level if the building materials industry had not been correspondingly advanced. The expansion of this industry can be seen by comparing the output figures for cement and brick. In 1913, the territory that is now the Russian Federation produced 1,200,000 tons of cement and 2,300 million bricks, while in 1958 it put out 22 million tons of cement and 17,200 million bricks.

Parallel with the extension and reconstruction of cement, brick, plaster and glass factories, new branches of the building industry

were set up. These include factories putting out prefabricated concrete building components and wall blocks, asbestos-cement and roofing slate.

There are huge forests and this allows timber to be felled on a big scale. The European North, the Urals and Siberia produce the most timber in the Russian Federation. The wood-working industry has also become highly developed. Substantial advances have been made in the output of prefabricated wooden houses, paper and cellulose.

Timber chemistry, formerly a semi-primitive branch of industry, has begun to develop on an industrial basis.

* * *

Development of the heavy industry has enabled the country to make notable progress in the output of consumer goods.

In Soviet years, many textile, leather and foot-wear, sewing, knitted-wear, furniture and other factories have been built in all the regions of the Russian Federation. Output of consumer goods is expanding steadily from year to year. In addition to the production of garments, plates and dishes and other household utensils, a tremendous leap has been made in the output of wireless and TV sets, motor cycles, scooters, bicycles, cameras and watches.

In 1956, the population bought over 21 million watches, more than three million bicycles and over four million wireless and TV sets.

The food industry has been raised to the level of an advanced industry with a high standard of technical equipment. The flour, meat and dairy, butter, sugar, fish, canning, confectionery and wine industries are turning out a large quantity of products. In 1957, the people consumed 3.5 times more meat and 3.6 times more butter and milk than in 1940, which was the most abundant pre-war year.

In the next few years, output of food-stuffs and consumer goods will be considerably increased in the Russian Federation.

Expansion of the light and food industries is being ensured by the steadily growing agricultural raw-material resources.

LAND

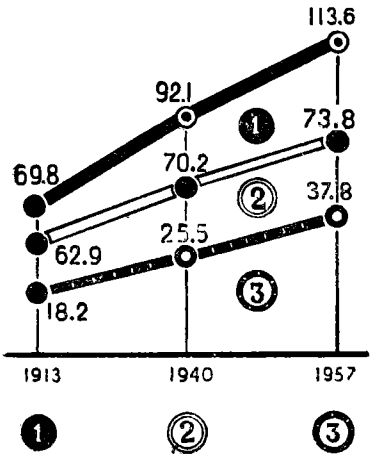
There are extensive possibilities of promoting farming in the Russian Federation.

The soil and the climate allow developing various branches of agriculture, depending on the natural features of the different regions. Of the republic's total land area of 1,713.7 million hectares, ploughland, meadows, pastures and so forth amount to 227.6 million hectares, including 130.7 million hectares of cultivated land. This is an enormous area for the cultivation of grain and other crops. The main ploughland is in the central regions, the Volga Area, the Urals, the North Caucasus and Western Siberia. Nearly 15 million hectares were added to them in 1954-56 through development of virgin and disused land. The largest area of new land was ploughed up in Altai Territory, and Orenburg, Omsk and other regions of Western Siberia and the Urals. In the old farming areas of European Russia, ploughland is extended chiefly by cultivating unproductive pastures, clearing undergrowth, reclaiming marshland and irrigating arid zones.

In the Russian Federation, the borders of farming have moved far north into the Arctic Circle, and to the east. Farming is making rapid strides in Eastern Siberia, where formerly there used to be only small, isolated seats of agriculture. These separate seats have now been united into large tracts of farmland, making it possible to meet the local demand for bread and to reduce long-distance transportation of grain.

Big grain centres have been established in different parts of the country, in the most diverse natural and geographical conditions. The result is that like the entire Soviet Union, the Russian Federation no longer fears droughts or other natural calamities that cause crop failures. In addition, the elements are combated by the creation of forest shelter belts against dry winds, measures to retain snow, moisture in the soil, and so forth.

Large-scale land-improvement is under way. By 1960, the Russian Federation will have 258,000 more hectares of irrigated land than in 1956, while the territory watered by river estuaries will be extended by 225,000 hectares. Within the same period, 16 million



Crop area (million hectares)

hectares of arid land will be irrigated in the North Caucasus, the Volga Area and Siberia. A total of 365,000 hectares of land will be reclaimed in areas with huge marshes (the North-West, the Centre, the Barabinsk Steppe in Siberia). Work has been started to reclaim land in the Meshchera Lowland in the heart of the European part of the R.S.F.S.R.

All this is helping to enlarge farmland, especially the crop area. In 1958, the area under crops in the Russian Federation totalled 114.7 million hectares.

In the post-war years, a great effort was made to equip agriculture with more machinery and by 1957 the Russian Federation had 965,500 tractors (in terms of 15 h.p. units) and 295,600 grain combines.

Data concerning the distribution of crops in the R.S.F.S.R. show that in 1957 grain crops were prominent, occupying 73,800,000 hectares, or two-thirds of the entire crop area.

Striking progress has been made in the distribution of different grain crops. Statistics reveal a tendency to move wheat into first place. Prior to the Revolution, this crop occupied less than 29 per cent of the total area under grain; in 1940 this figure rose to over 36 per cent, while in 1957 it was more than 47 per cent. The area under wheat has grown not only in the black soil regions, for in Soviet years this crop penetrated into the non-chernozem belt and far to the north and east. As a result, the marketable wheat base has shifted from the Ukraine to the Russian Federation. Today, the world's largest area under wheat is in the R.S.F.S.R. In 1955, the Russian Federation had 35,800,000 hectares under wheat,[1] China had

[1] In 1957, there were 37,800,000 hectares of land under wheat in the R.S.F.S.R.

26,800,000 hectares, the U.S.A. 19,100,000 hectares, India 10,900,000 hectares and Canada 9,500,000 hectares.

If the Russian Federation's grain output for 1953 is taken as 100 per cent, then the figures for 1957 and 1958 will be 132 and 160 per cent respectively.

Maize, a valuable fodder crop, has been receiving great attention in recent years. Prior to the Revolution there were less than 300,000 hectares of land under this crop, but by 1957 this area increased to nearly two million hectares. In 1960, the U.S.S.R. will be planting maize on an area of 28 million hectares, more than half of which will be in the Russian Federation. As a grain, maize is considerably less widespread than any other crop because it is warmth-loving. The principal regions where it is cultivated in the R.S.F.S.R. are in the North Caucasus, the Lower Don, the Volga Area and the Centre.

In the R.S.F.S.R., the output of maize for grain and silage increased 3.3 and 2.2 times in 1958 compared with the output in 1957.

Industrial crops such as long-staple flax, hemp, sunflowers and sugar-beet play an important role in farming. Flax is grown mainly in the non-chernozem belt of the European part of the R.S.F.S.R., which has the biggest tract under this crop in the world. Compared with pre-revolutionary years, five times more sugar-beet and over three times more sunflowers are now grown.

In tsarist Russia, sugar-beet was cultivated only in the central regions (former Kursk, Voronezh and Orel provinces) of what is now the Russian Federation. At present, this valuable crop is sown in the Volga Area, in Bashkiria and even in Siberia and the Soviet Far East.

The growth of towns and workers' townships has led to a bigger demand for vegetables, as a result of which the area under them has increased four times compared with 1913. Within the same period, the area under potatoes, which are at once a food, fodder and industrial crop, has grown 2.5 times.

An abundance of fruit and berries grow in the Russian Federation, which has more than a third of all the orchards and berry plantations of the Soviet Union. The principal fruit areas are in the south of the republic (the North Caucasus, the Lower Don, the Lower

Volga) and the chernozem Centre. But fruit-growing is steadily penetrating into regions with sterner natural conditions, right up to the Urals, Siberia and the Soviet Far East.

Huge quantities of fodder are grown in the Russian Federation, where the area under these crops is increasing from year to year. In 1957, they were grown on 27,900,000 hectares of land, which is more than 20 times bigger than the fodder crop area in 1913.

Measures were lately taken to effect a steep rise in the output of animal products. Throughout the country collective farmers are undertaking engagements to ensure that the task of overtaking and surpassing the U.S.A. in per capita output of meat, milk and butter is carried out in the immediate future. In 1957, the Soviet Union as a whole procured and purchased 12 per cent more meat and 18 per cent more milk than in 1956. A rapid growth such as this is yet another guarantee that the Soviet Union will reach the target it has set itself.

The progress of agriculture in the Russian Federation, and in the Soviet Union as a whole, is annually shown at the Exhibition of Economic Achievement of the U.S.S.R.

In the period between 1959 and 1965, farming in the Russian Federation will reach a level where it will fully meet the staple food requirements of the people. There will be a sharp increase in the output of agricultural raw materials for the light and food industries.

In 1965, the 1957 level of the output of grain, industrial crops, vegetables, meat, milk and wool will be left far behind. It is planned to extend the area under maize by reducing the areas under oats and other uneconomical crops. More land will be irrigated and reclaimed and water will be directed towards pastures.

Great advances will be made by farming in the non-chernozem belt. The Kuban area will be a big producer of both sugar-beet and sugar. Sugar-beet will also be further cultivated in the central black-soil zone, in the Urals and in Siberia. The output of oil-bearing crops is being increased in the eastern and south-eastern regions.

In Siberia, the Soviet Far East, the Volga Area and the North Caucasus particular attention is being devoted to meat-and-dairy and

specialized meat cattle-breeding. Dairy cattle-breeding is being pushed ahead in suburban areas.

The seven-year plan provides for further intensified electrification of agriculture.

COMMUNICATIONS

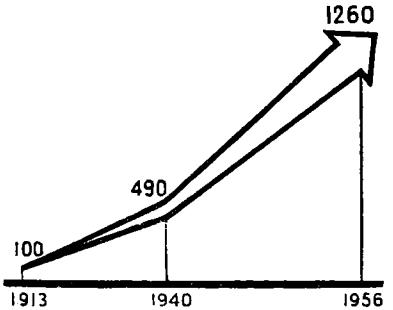
The rapid development and the changes in the distribution of industry and agriculture in the Russian Federation have brought about an extension of economic links and a change in the country's transportation network.

Prior to the Revolution, there was an extremely sparse network of railways in the Northern and Asian parts of the country. But during the period of the first five-year plans new railways were built to the north and the east. Transport communications between the Centre and the Urals and between the Urals and the Kuznetsk Basin were radically improved.

The economically important North Pechora Railway, which runs to Vorkuta and the Pechora Coal Basin, was one of the most difficult to build. This 1,600-kilometre line crosses regions with eternal congelation.

Roads were built in the meridional direction as well. The Volga lines from Kazan to the south link up several latitudinal railways. Another line, running in a bigger arc across the Northern, Central and Southern Urals, leads down the Ural Mountains to the Caspian Lowland.

The longest of the new lines is the South-Siberian Railway known as the Yuzhsib. Although it is far shorter than the old Trans-Siberian Railway from Moscow to Vladivostok (9,332 kilometres), the chief transport artery of the Eurasian continent, the importance of the second Siberian railway is nevertheless very great. The Yuzhsib was built to provide direct communication between the Urals and the Kuznetsk Basin. Its economic importance and its role as a means of transport proved to be far greater than was thought when it was planned. It runs across territory where fabulous reserves of iron ore and minerals have been discovered in recent years.



Growth of transport turnover (in per cent of 1913)

The period of the five-year plans witnessed the construction of the Moscow-Donbas line, the Black Sea Railway (which considerably shortened the route to the Transcaucasus) and the Kizlyar-Astrakhan Railway.

The result was that the railway network in the Russian Federation increased from 38,700 kilometres in 1913 to 68,900 kilometres in 1955. In the period from 1913 to 1956, the freight turnover of the railways increased more than 18-fold.

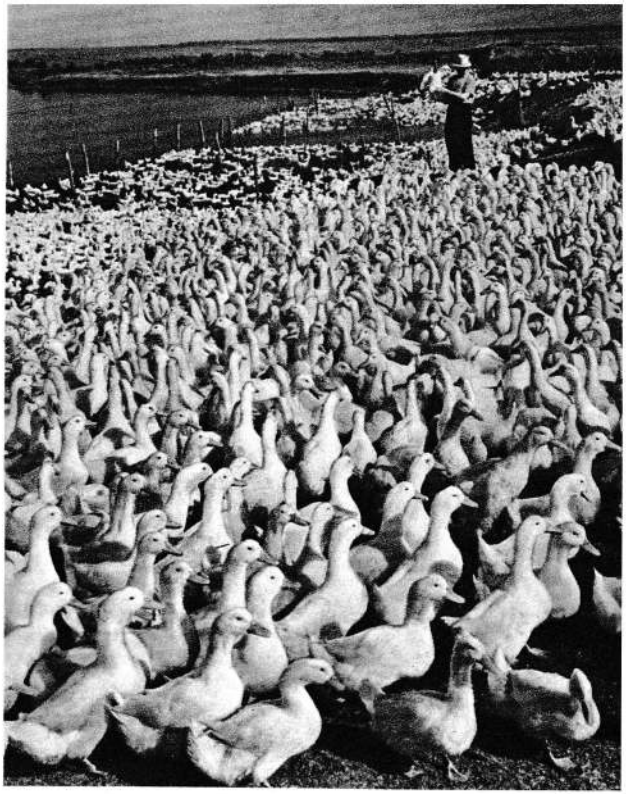
At present, new railways are being built chiefly in Siberia and the Urals. The haulage is being technically reconstructed with emphasis on electric, diesel and gas turbine locomotives. Within the next 10-15 years electric haulage will be extensively used on all lines with heavy freight and passenger traffic, mountain lines and the suburban sections of large industrial centres.

The big rivers, seas and lakes in the Russian Federation make it possible to promote the development of the water transport. The freight carried by this transport consists chiefly of timber, building materials, oil, coal, grain and salt.

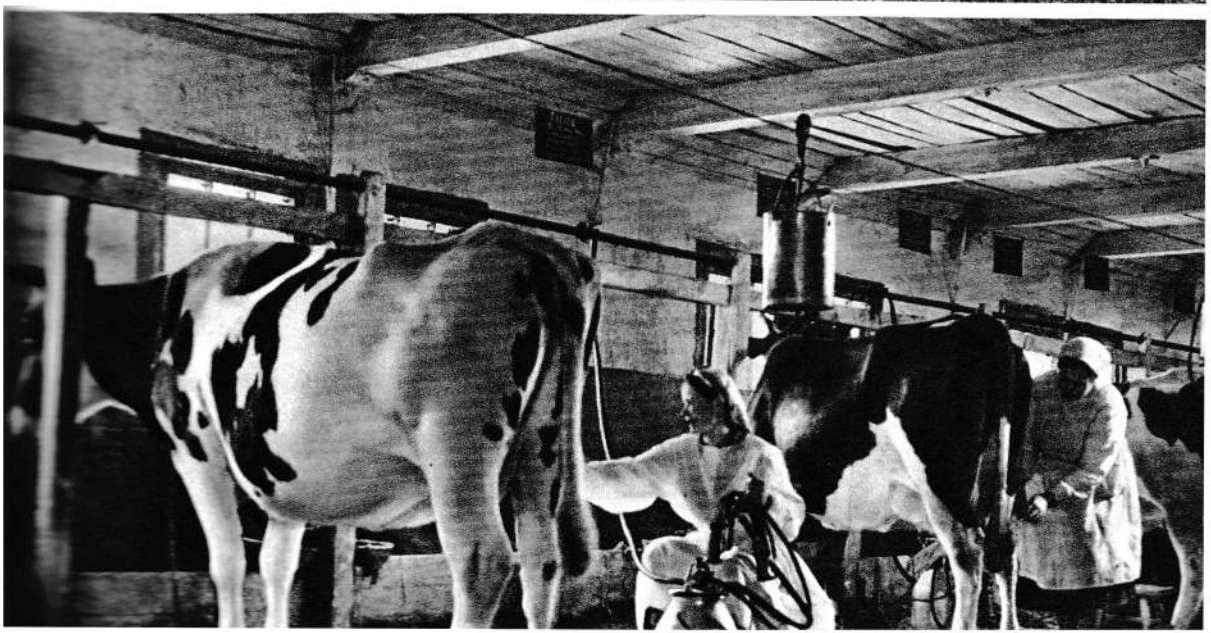
The growth in the freight turnover and transportation of passengers by water was facilitated by the reconstruction of waterways, the building of such big canals as the White Sea-Baltic Canal, the Moscow Canal, the Lenin Volga-Don Canal and the Manych Water Road, and by the improvement of the old Volga-Baltic Waterway (the Mariinskaya Water System).

The opening of the Northern Sea Route was an important achievement. For hundreds of years, Russians dreamed of a short route to the Far East past the shores of Siberia. But the obstacle was the Kara Sea, known as the ice cellar. At the same time it was absolutely necessary to find a northern route, as that would solve the prob-

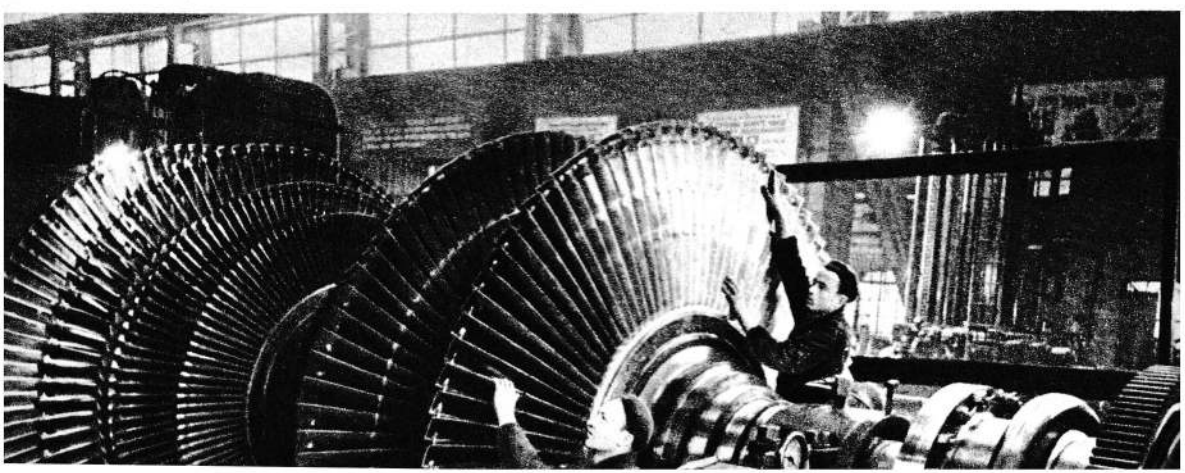
Peking ducks at the Iskra State Farm, Balashov Region



Dairy department of the state farm at the Vorkutaugol Mines in the Komi Autonomous Republic



Assembling the rotor of a 200,000-kw. turbine at the Leningrad Metal Works



Exhibition of U.S.S.R. Economic Achievement

TU-104s at the Vnukovo Aerodrome, Moscow

Mechanized transportation of timber at the Arkhangelsk Paper and Pulp Mill

lem of the economic and cultural development of the entire Asian North. It was only in 1932 after extensive preparation that the first ship in the history of seafaring completed the journey from Arkhangelsk to Vladivostok in one navigation season. This was done by the ice-breaker *Sibiryakov*. Four years later, 14 freighters made a through voyage over this route. The Northern Sea Route is now a normally functioning lane. Powerful diesel ice-breakers convoy ships through the ice barriers of the Arctic. Along the Arctic seaboard there are now radio and meteorological stations, fuel bases, ports and aerodromes. The polar air service works in close contact with the maritime fleet.

Airways make up a dense network throughout the whole of the Soviet Union. The chief lines hook up Moscow with the biggest cities and with the capitals of many foreign countries. The comfortable and spacious TU-104 jet airliner plies the main airlines in Russia (Moscow-Vladivostok, Moscow-Tashkent and others) and several international lines (Moscow-Peking, Moscow-Prague).

Thanks to the construction of new motor highways and the increased output of fast coaches, the automobile transport has been raised to a high level of efficiency.

ECONOMIC-GEOGRAPHICAL REGIONS

Because of its great diversity of natural and economic conditions, the Russian Federation has been divided up into historically shaped economic regions. This division is based on the following circumstances: geographical position, availability of raw materials, production specialization, level of industry and agriculture, the production experience of the local population, transport facilities and other economic and geographical conditions.

With these factors taken into account, nine principal economic regions have been marked out in the R.S.F.S.R. They are the Centre, the North, the North-West, the Volga Area, the North Caucasus, the Urals, Western Siberia, Eastern Siberia and the Soviet Far East.

The division of the republic into economic regions enables it to make the fullest use of all its natural and economic resources.

MAP OF THE ECONOMIC AREAS OF THE R.S.F.S.R.

ECONOMIC-GEOGRAPHICAL REGIONS OF THE R.S.F.S.R.

Territory and Population (1959)

Economic region	Territory, 000 sq. km.	Share, per cent	Population, 000,000	Share, per cent	Density of population per sq. km.
Centre	1,008	5.9	43.4	37.0	43.0
North	1,158	6.7	3.4	2.9	2.9
North-West	509	3.0	8.1	6.9	15.9
Volga Area	385	2.2	10.9	9.2	28.4
North Caucasus	426	2.5	11.6	9.9	27.2
The Urals	751	4.4	16.5	14.0	22.0
Western Siberia	2,573	15.0	12.3	10.5	4.8
Eastern Siberia	7,210	42.1	7.0	5.9	0.97
Soviet Far East	3,122	18.2	4.3	3.7	1.4
Total for the R.S.F.S.R	17,137	100.0	117.5	100.0	6.8

The economic importance of these regions can be seen from the following tables.

An important task in forming the economic regions is to draw industrial enterprises closer to the sources of raw material and to the consumers. For example, major power developments are, as a rule, built in areas with rich fuel or hydropower resources. Processing factories are located primarily in areas with a developed extracting industry.

However, with the present high level in the development of the productive forces the importance of this factor is to some extent diminished by technical progress. For example, nuclear power is allowing power centres to be built in places with small power resources. Gas and oil pipe-lines are making it possible to build big oil-refineries and chemical factories far away from the sources of raw materials (in Siberia and in the Soviet Far East).

Each economic-geographical region has industrial seats which play the leading role in its economic advance. For example, in the Centre this seat is Moscow, in the North-West—Leningrad, in the Volga Area—Kuibyshev and Stalingrad, in the Urals—Sverdlovsk, in the North Caucasus—Rostov-on-Don, in Western Siberia—Novo-

INDUSTRY OF THE R.S.F.S.R. (1956)

Economic region	Steel output, 000,000 tons	Share, per cent	Coal output, 000,000 tons	Share, per cent	Timber output, 000,000 cu. metres (1955)	Share, per cent	Fishing, 000 tons	Share, per cent	Sugar output (granulated), 000 tons	Share, per cent
Centre	2.69	9.4	42.2	16.8	75.3	25.7	14.6	0.7	717.1	85.4
North	0.01	0.3	15.9	6.3	42.0	14.3	135.3	6.2	—	—
North-West	0.95	3.3	—	—	25.7	8.7	872.4	39.7	—	—
Volga Area	1.65	5.8	—	—	8.2	2.8	269.1	12.2	7.0	0.8
North Caucasus	0.97	3.4	28.2	11.2	5.0	1.7	126.5	5.7	59.2	7.1
The Urals	17.50	61.0	52.3	20.9	59.3	18.2	7.0	0.3	10.8	1.3
Western Siberia	4.15	14.5	66.1	26.4	28.7	9.8	59.6	2.7	19.7	2.3
Eastern Siberia	0.40	1.4	28.8	11.5	38.0	13.0	27.5	1.3	0.4	0.0
Soviet Far East	0.28	0.9	17.3	6.9	16.9	5.8	687.3	31.2	25.2	3.1
Total for the R.S.F.S.R.	28.60	100.0	250.8	100.0	299.1	100.0	2,199.3	100.0	839.4	100.0

AGRICULTURE (1956)

Economic region	Total crop area, 000 hectares	Share, per cent	Crop Areas								Livestock					
			Grain crops, 000 hectares	Share, per cent	Industrial crops, 000 hectares	Share, per cent	Vegetables, excluding potatoes, 000 hectares	Share, per cent	Potatoes, 000 hectares	Share, per cent	Cattle, 000 head	Share, per cent	Pigs, 000 head	Share, per cent	Sheep, 000 head	Share, per cent
Centre	33,607	29.4	20,237	26.7	2,355	38.2	322	38.7	2,747	52.7	12,300	33.0	12,487	41.5	18,633	27.7
North	1,158	1.0	606	0.8	73	1.1	11	1.3	82	1.6	937	2.5	417	1.4	510	0.8
North-West . .	1,785	1.6	713	0.9	162	2.6	34	4.1	190	3.6	1,149	3.1	1,171	3.9	856	1.3
Volga Area . .	16,202	14.1	11,652	15.4	799	13.0	74	8.9	411	7.9	3,571	9.5	2,429	8.1	9,741	14.5
North Caucasus .	15,699	13.7	10,002	13.2	1,377	22.3	145	17.5	198	3.8	4,923	13.1	4,551	15.1	15,146	22.5
The Urals . . .	17,191	15.0	12,162	16.1	418	6.8	96	11.6	655	12.6	4,590	12.2	2,943	9.8	7,069	10.5
Western Siberia	20,709	18.1	14,937	19.7	597	9.7	69	8.3	546	10.5	6,093	16.3	3,697	12.3	8,344	12.4
Eastern Siberia .	6,262	5.5	4,451	5.9	76	1.2	35	4.2	240	4.6	3,075	8.2	1,677	5.6	6,679	9.9
Soviet Far East .	1,792	1.6	1,015	1.3	313	5.1	45	5.4	146	2.7	778	2.1	715	2.3	250	0.4
Total for the R.S.F.S.R. . .	114,405	100.0	75,775	100.0	6,170	100.0	831	100.0	5,215	100.0	37,416	100.0	30,087	100.0	67,228	100.0

sibirsk, in the Soviet Far East—Khabarovsk, and in the North—Arkhangelsk.

The further improvement of the management of industry and construction carried out throughout the Soviet Union in 1957 was an extremely important contribution towards economic progress.

This reorganization became necessary because of the rapid development of the productive forces and expansion of the entire economy. That made it imperative for operational management of industry and construction to be moved closer to the different localities, closer to the factories and construction sites. To this end the number of departments directing the various branches of industry has been reduced and the principal attention devoted to new forms of management based on the territorial principle. These forms of management have taken the shape of regional economic councils, each of which is linked with an economic administrative region. As distinct from the big, main economic regions (the Urals, Siberia, the Volga Area and so forth), these smaller units are regions, territories, autonomous republics singly or in small unions. A total of 68 administrative economic regions have been set up in the R.S.F.S.R.

Reorganization of the management of the national economy has brought about an improvement in the system of planning on a country-wide scale and led to a correct combination of a centralized state leadership of the economy with the initiative of local government bodies. Moreover, it has placed a greater responsibility on these bodies for the fulfilment of state plans. There are now opportunities of making better use of the natural resources in each of the economic regions.

This is expediting the further development of the country's productive forces and is making for a higher standard of living.

POPULATION, SCIENCE, CULTURE

The Russian Federation has Europe's biggest and the world's fourth biggest population—117,500,000. Altogether 61,500,000 people live in the towns, and 56,000,000 in the countryside.

There are many peoples in the Russian Federation, but Russians are the most numerous among them. Throughout the Soviet Union

there are over 100 million Russians, most of whom live in the R.S.F.S.R.

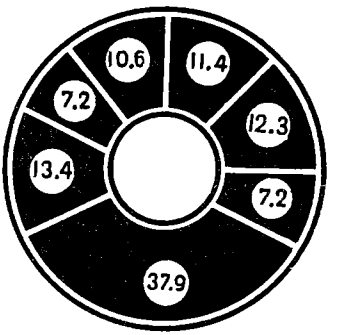
The other peoples living in the Russian Federation are united in national autonomies. The regions with the largest number of nationalities are the Volga Area and the North Caucasus. The Volga Area is inhabited by Tatars, Maris, Chuvashes and Mordovians, the foothills of the Caucasian Mountains by Adygeis, Cherkesses, Kabardinians, Chechentsi, Ingushes, Kalmyks and Daghestan mountaineers. Bashkirians and Komi-Permyaks live in the Urals, Karelians in the north-west, and Komis and Nentsi in the north of European Russia. The vast expanses of Siberia are inhabited by Altaians, Khakassians, Tuvinians, Buryats and Yakuts. In the Extreme North of Siberia there are Evenki, Chukchi, Nentsi, Khanty, Mansi, Dolganians and Koryaks.

In the R.S.F.S.R. the density of the population is not uniform: in Eastern Siberia it is 0.97 persons per square kilometre, in the North it is 2.9, in the South—28, and in the Centre—43. If the population were to be distributed uniformly, there would be 6.8 persons per square kilometre. This is below the average density of the population in the world, which is 16 persons per square kilometre. From this it follows that the country has enormous reserves of territory which can be further developed.

Industrialization has resulted in a considerable growth of the population of big towns. For example, in the period from 1926 to 1956 the population of Moscow increased more than 2.4 times, of Gorky —nearly four times, of Kuibyshev—more than four times, and of Novosibirsk—six times. Within that period the urban population increased 3.7 times.

Many new towns and town-type settlements sprang up at the same time that the old centres expanded. The number of towns grew from 461 in 1926 to 839 in 1956. The big towns that have appeared on the map of the R.S.F.S.R. include Magnitogorsk, Komsomolsk-on-Amur, Stalinogorsk, Elektrostal, Angarsk, Norilsk, Magadan, Zhigulevsk, Krasnouralsk, Mednogorsk, Igarka and Bratsk.

Town improvement and the planting of greenery is being given considerable attention. All building is done according to general plans and that gives symmetry to the towns and creates conveniences



Distribution of workers and employees in the national economy in 1957 (in per cent of total number)

for the population. Rural settlements have also become different. Even in the most remote areas, the Extreme North for example, villages have schools, clubs and hospitals. Electricity and the radio have penetrated into what were backwoods only recently and have become a part of life in the countryside.

The standard of living is continuously rising on the basis of economic development in the republic. The growth of the national income is an over-all index of the people's well-being. On a per capita basis, the U.S.S.R. national income increased 14 times in the period from 1913 to 1957.

During Soviet years, the peoples of the R.S.F.S.R. have scored tremendous cultural successes. Under tsardom, there were 75 illiterates per 100 of population. Today, illiteracy is a thing of the past. The total number of schools in the Russian Federation has increased from 77,300 in 1914-15 to 125,100 in 1956-57, while the body of pupils has grown from 5,700,000 to 15,500,000 and the number of teachers from 167,100 to 971,700.

There is now a real people's intelligentsia in the Russian Federation and many specialists have been trained for all branches of economy and culture.

The number of institutions of higher learning has increased from 72 in 1914-15 to 441 in 1957-58, while the student body—from 86,500 to 1,326,500. Students receive stipends and accommodation in hostels. There has been a considerable rise in the number of secondary special educational establishments (from 297 in 1914-15 to 2,054 in 1957-58) and in the number of pupils in them (from 35,400 to

Section of the Likhachov Auto Works, Moscow

Entrance to the Lenin Volga-Don Shipping Canal

Control panel at the Elektrostal Works, Moscow Region

Khrushchov Automatic Bakery, Moscow

1,199,000). These figures show that there has been a real cultural revolution in the country.

Reorganization of the system of secondary and higher education was started in the Russian Federation, as in the Soviet Union as a whole, in 1958. In schools, academic training is being combined with productive labour accompanied by a higher level of education and of the upbringing of the rising generation. After reaching a set age, all young people join in socially useful work and instruction in the fundamentals of science is linked with practical activity in industry or agriculture. This reorganization is closing the gap that had existed between study and life.

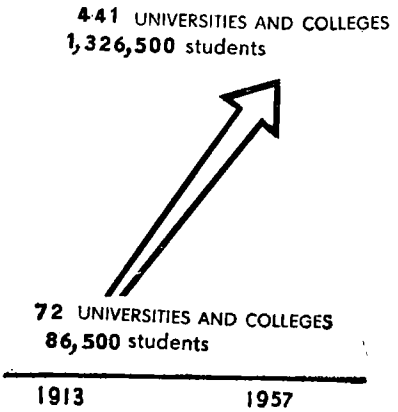
Perfection of the system of higher education is aimed at improving the practical and theoretical training of specialists for the different branches of the national economy. Young people with experience in practical work get enrolment priority at universities and colleges. This ensures a higher level in the training of qualified cadres for all spheres of knowledge.

By 1957, the higher material and cultural level and the development of public health services have forced the mortality rate to drop to nearly a quarter of the 1913 figure. That same year there were 202,800 doctors against the 16,000 doctors in 1913. No charge is taken for medical assistance. The network of hospitals, polyclinics and out-patient hospitals has grown substantially. These establishments are fitted with the most up-to-date equipment that meets the requirements of advanced science.

The Soviet Government is doing much to bring up a healthy and strong generation and is devoting great attention to mother and child protection. There are thousands of crèches, kindergartens, Young Pioneer palaces and other children's and extra-school establishments. The upbringing of children is based on methods worked out by Soviet pedagogical science.

The October Revolution ushered in a new era in the development of science and culture in Russia.

Scientists are helping to bring to light and make fuller use of the country's natural resources and to compel the forces of nature to



Development of higher education

serve the national economy. The centre of scientific thought in the Russian Federation and in the whole of the Soviet Union, the Academy of Science of the U.S.S.R. with its branches in the major economic regions of the R.S.F.S.R., has matured and grown strong. There are academies embracing different fields of knowledge (medicine, agriculture, architecture and building, pedagogics).

In the course of 40 years, the number of scientific establishments in the R.S.F.S.R. has increased seven times. In 1956, there were 166,200 scientific workers as against 8,000 in 1913.

Technical progress is founded on the successes of science.

Epoch-making achievements have been scored by Soviet Russia in the utilization of nuclear power for peaceful purposes.

Theoretical research into the structure of the atom nucleus, atomic power and radioactivity laid the foundation for the Soviet nuclear industry. The world's first nuclear power station was commissioned in the R.S.F.S.R. in 1954, while in 1954 Soviet scientists put in operation the world's biggest synchrotron, which accelerates protons to an energy of 10,000 million electron-volts.

Utilization of radioactive isotopes (or tracer atoms as they are called) in industry makes it possible to penetrate into the most intricate technological processes. Neutrons and tracer atoms are used in the search for oil. Radioactive cobalt is used in defectoscopy in the engineering and ferrous metals industries. Tracer atoms are rendering a great service to medicine as well.

Electronic engineering has made rapid progress. Russia is now producing a wide range of instantaneous-action electronic instruments, including electronic computing machines which tackle the

most intricate mathematical calculations and work out 7,000-8,000 sums per second.

Semi-conductors have opened new ways of implementing scientific and engineering projects. This has brought about a revolution in radio engineering and in some branches of electrical engineering.

Russian scientists and engineers have been extremely successful in developing jet machines. Splendid jet and turboprop passenger airliners are being produced in the Soviet Union. They include the TU-104, the TU-104A, the TU-110, the AN-10, and the IL-18. A. N. Tupolev recently designed a new high-speed airliner, the TU-114, which has turboprop engines and carries up to 220 passengers. This giant aircraft can make non-stop flights from Moscow to Vladivostok, Peking, Tokyo, Rangoon or New York. Russian scientists and engineers have constructed a super-long-distance inter-continental ballistic rocket.

With the help of a ballistic rocket, the Soviet Union launched the world's first earth satellite in October 1957. This was of tremendous importance in giving scientists a knowledge of the properties of outer space and helping them to study the earth as a planet of the solar system. The second Sputnik, placed in orbit a month later, carried a hermetically sealed container with an animal. This enabled scientists to study important medical and biological problems linked with interplanetary flight. The third Soviet Sputnik, weighing 1,327 kilograms, was launched on May 15, 1958.

An important aspect of the activity of Russian scientists is their study of little-known territories, principally the Arctic and the Antarctic.

These investigations have a rich history of their own. In the past, the Arctic was studied by separate expeditions that were of an episodic character and the investigators did not have the support of the tsarist government. The study of the high latitudes entered a new era in Soviet years. Polar investigations are now carried out on a nationwide scale and have acquired broad scope. There is now an Arctic Research Institute and the Central Administration of the Northern Sea Route. A large contribution to the study of the Arctic is being made by special drifting stations in the Central Polar Basin.

Russian complex scientific expeditions were fitted out and sent to

the Antarctic in connection with the International Geophysical Year, which began in 1956. The Antarctic exerts a great influence on the climate throughout the world, on the structure and dynamics of the oceans, and on the geophysical processes taking place on the earth. The task of these expeditions is to carry out geophysical and geographic investigations in the Antarctic continent and in the Antarctic waters. Soviet Antarctic investigators are working in conformity with a plan agreed upon with the expeditions of other countries and in close cooperation with them.

Modern Russian literature and art has inherited a rich legacy from the past. The classical works of Russian writers such as Alexander Pushkin and Mikhail Lermontov, Lev Tolstoi and Anton Chekhov, Nikolai Gogol and Mikhail Saltykov-Shchedrin, the creations of brilliant composers like Pyotr Chaikovsky and Mikhail Glinka, Modest Mussorgsky and Alexander Borodin, and the paintings of Ilya Repin and Vasily Surikov, Ivan Shishkin and Isaac Levitan, and many others were an invaluable contribution to the treasure-store of world culture.

The October Revolution opened a new chapter for Russian literature and art. Maxim Gorky, the founder of the method of socialist realism in prose, came to the fore at the fount of Soviet literature. He wrote about Russian life in the epoch of imperialism and the popular revolutions. Gorky's works greatly influenced the development of modern literature. In the years Soviet literature first took shape, one of its leaders was the poet and tribune Vladimir Mayakovsky. Since then Alexei Tolstoi, Mikhail Sholokhov, Nikolai Ostrovsky, Alexander Fadeyev, Konstantin Fedin and many other writers have become world famous.

Russian literature played the role of a spiritual and artistic school for the national literatures of the small peoples inhabiting the Russian Federation.

The fine arts developed side by side with literature. Realistic trends triumphed in painting as in literature. Outstanding among modern paintings are the battle canvases of Mitrofan Grekov, the historical pictures of Isaac Brodsky and Boris Yoganson, and the portraits by Vasily Meshkov, Igor Grabar, and Sergei Gerasimov. Remarkable

sculptures have been created by Vera Mukhina, Nikolai Tomsky and Sergei Konenkov.

Soviet composers have made a great contribution to music. The names of Dmitry Shostakovich, Sergei Prokofiev, Reinhold Glière and many other composers are known throughout the world.

The Soviet epoch is also reflected in the popular songs composed by the people themselves. Soviet songs are sung not only in Russia but also far beyond her borders as the messengers of peace, fraternity and friendship.

Soviet performers—the Russian ballet, the dramatic theatre, and musicians—enjoy a well-deserved fame. Their tours abroad are invariably successful.

The Russian cinema is an important part of cultural life in the country.

The culture of all the nationalities of the Russian Federation began to flourish in Soviet years. Under tsardom many of them did not have even a written language, yet in Soviet years they have created their own literature and their own national theatre, national opera, symphonic music and fine arts.

Printing is an important index of cultural growth. Back in 1913, pre-revolutionary Russia published 20,000 titles with a total printing of 76 million copies, but in 1940 the corresponding figures for the R.S.F.S.R. alone were 33,000 titles and 354 million copies, while in 1955 these rose to 36,000 titles and 811 million copies.

In 1956, the R.S.F.S.R. had 4,552 newspapers with a daily circulation of 35 million copies, and 1,246 journals. In all towns and district centres radio broadcasting is in Russian, while in the autonomous republics and regions the language of the local nationality is also used. New TV broadcasting centres are appearing all over the country.

the ACROSS RUSSIAN FEDERATION

IN THE HEART OF THE GREAT RUSSIAN PLAIN

In the very centre of the Great Russian Plain, on the Moskva River and its tributary the Yauza, stands the city of Moscow, capital of the Russian Federation and of the Soviet Union.

One of the biggest cities in the world, Moscow occupies an area of more than 350 square kilometres. Its 820 streets and boulevards have a total length of over 600 kilometres.

Moscow's geographical position in the heart of Russia determined its development as the economic, cultural and national centre of the Russian State.

The city was founded by Prince Yury Dolgoruky and is first mentioned in the chronicle for the year 1147. In the early 13th century, it was the capital of an independent principality.

Ancient Rus consisted of dismembered feudal principalities, a fact which undermined her defensive capacity. Early in the 13th century, she was invaded by the Tatars, who had already subjugated many Asian countries. The Russian people heroically defended their motherland, bearing the brunt of the Tatar thrust westwards. They stopped the Tatar hordes and for two and a half centuries were a barrier between them and the countries of Central Europe. Alexander Pushkin, the great Russian poet, wrote that "Russia most certainly had a lofty destiny. Her boundless plains drained the strength of the Mongols and halted their invasion at the very edge of Europe; the barbarians did not dare leave an enslaved Russia in their rear. . . ." The Tatars laid the land waste, destroyed towns and exterminated the inhabitants en masse. Heavy tribute was imposed on the Russian

principalities. The productive forces declined. The Tatar yoke, Karl Marx said, not only crushed, but dishonoured and withered the very soul of the people that fell its prey.

The 14th century witnessed the rise of the Principality of Moscow. Under Prince Ivan the Money-Bag it became strong enough to start an open struggle against the Tatars.

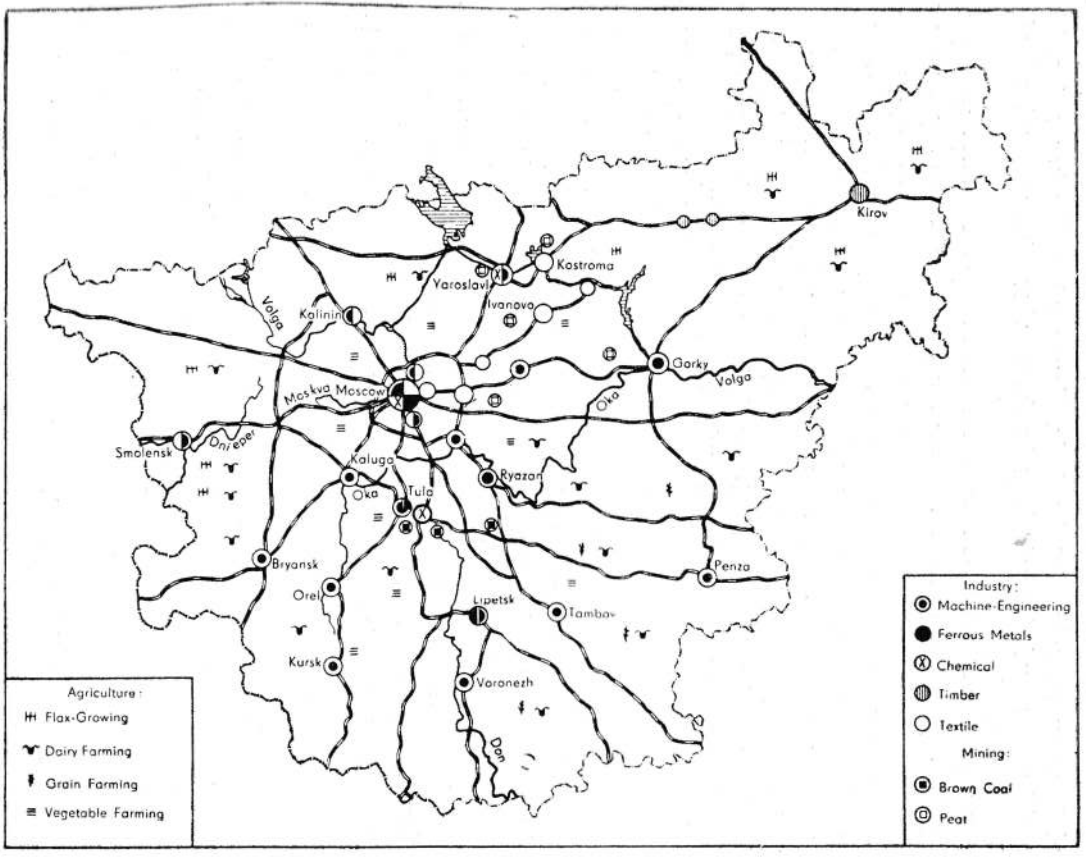
The invaders were dealt a decisive blow in 1380 in the Battle of Kulikovo, which helped to further the rise of the national consciousness of the Russian people. It showed that the hated yoke could be overthrown only through the concerted efforts of the whole people. Indeed, it was only after the unification of all the Russian lands in a single state that Tatar rule was finally overthrown in 1480 under Ivan III, Grand Prince of Moscow. The fight of the Russian people against the Tatars was headed by Moscow, which began to unite all the Russian lands and became the capital of the centralized Russian state in the late 15th century.

At first Moscow was a wooden fortress, a kremlin. On the south and west were the Moskva River and a small tributary, the Neglinka, which now flows under the city.

During the reign of Grand Prince Dmitry Donskoi, in the late 14th century, these walls were no longer adequate as a means of defence and did not meet the requirements of the increasingly important role that Moscow began to play. They were pulled down and replaced with walls built of white limestone. Many churches and other buildings were also built of limestone and the people began to call Moscow the white-stone city.

The Kremlin was rebuilt at the close of the 15th century and has hardly been altered at all since then. The old crumbling limestone walls gave way to walls of red brick with battlements and towers. Magnificent edifices were erected within the Kremlin. One of these is the famous Angulous Palace with its facing of faceted stone—the work of the architects Ruffo and Solari. Prior to Peter the Great, the throne hall was in this palace. The beautiful Cathedral of the Assumption, built by the Italian Aristotle Ridolfo Fioravanti, stands beside the Angulous Palace. The most solemn rites, including the crowning of the tsars, were performed in this cathedral. Near it is the Cathedral of the Annunciation with its ten cupolas, and the

CENTRAL REGIONS



Cathedral of the Archangel with the tombs of Russian tsars up to Ivan the Terrible. All these cathedrals were built after the model of Russian churches in Vladimir, Novgorod and other cities. Their architecture and the paintings in them reflect the national art of the Russian people.

With the consolidation of a centralized state power in the 16th century, Moscow became not only the biggest city in the land but also one of the most important cities of Europe. Moreover, it developed into the economic centre of the country. The importance of the different crafts concentrated in it spread beyond the confines of a single city. The goods manufactured by the craftsmen of Moscow had a market throughout the country. The abundance of Russian and foreign merchandise in Kitai-Gorod, Moscow's trading centre, never failed to amaze the foreigners who came to the city.

When St. Petersburg became the capital in 1712, Moscow did not lose its economic importance and continued developing as Russia's biggest industrial and trading centre. The expansion of the Russian market stimulated the rise of various industries in Moscow on the basis of developed handicrafts. The broadcloth, silks, linen, leather, glass, paper, metal ware, and dyes put out by these industries were sold all over the country.

In Moscow, industry began to develop at an especially fast rate in the second half of the 19th century. This and the city's growth as a centre of trade was the result of the general upsurge of economy throughout Russia. Another major factor contributing to this was Moscow's position as the economic centre of the country. The city's importance was further enhanced with the building of railways fanning out in many directions and linking it up with areas producing raw materials and with home and foreign markets. Textiles, particularly cotton, were Moscow's main products. This period, however, also witnessed the rise of a metal-working industry. Many industries—food, sewing, leather and foot-wear, wood-working, publishing and printing—sprang up as Moscow expanded. These catered for the needs of this big city's economy and population. In the course of a century, from 1811 to 1912, Moscow's population increased from 270,000 to 1,600,000, i.e., six times. On the eve of World War I, Moscow was one of the largest industrial centres in Russia.

Moscow, capital of the Soviet Union, changed beyond recognition in the years following the October Revolution when the country was reconstructed along socialist lines.

A General Plan of Reconstruction was adopted for Moscow in 1935. While preserving the old radial-ring scheme, it provided for a tremendous extension of the city's territory, a fundamental replanning of the streets and the building-up of new districts.

Under this long-term plan, the territory of Moscow will expand up to 600 square kilometres. Development has been started in the south-western area, which stands on the highest ground and is the most healthful as a residential district. A new town has sprung up in recent years as a result of the vast construction that has been going on in this district.

Most of Moscow's old districts have changed strikingly. Krasnaya Presnya, Usachovka, Dubrovka and other workers' outskirts have been reconstructed. Today they are modern districts which are in no way inferior to the central districts. The Simonovskaya Sloboda, which prior to the Revolution was nothing but a collection of ramshackle huts with badly lighted muddy streets, has changed completely. The huts have given way to comfortable apartment houses, schools, hospitals and a Palace of Culture. The streets have been paved with asphalt. The Likhachov Auto Works, one of the biggest and most up-to-date industrial enterprises in the country, is in this district. Blagusha, an old workingmen's outskirt, is now the Stalin District and one of the capital's most important industrial areas. Numerous scientific establishments are now located in the Zamoskvorechye, a former merchants' residential district. The splendid Lenin Prospekt, a new thoroughfare stretching for more than seven kilometres, runs through this district. It connects the heart of the city with the new South-Western District. Along this thoroughfare are the Presidium of the U.S.S.R. Academy of Science, the Oil and Mining Institutes and the Steel Institute.

Kutuzovsky Prospekt, one of the most beautiful of Moscow's new streets, extends from the Sadovoye Koltso across the New Arbat Bridge, along the former Mozhaisk Highway, the Kutuzovskaya Sloboda, and a section of the Moscow-Minsk Motor Road. This street got its name from the Kutuzov hut, where General Fieldmarshal

Mikhail Kutuzov convened the famous military council on the eve of the Battle of Borodino. A panorama of the battle will be set up near the Kutuzov hut.

The Leningrad Prospekt is up to 120 metres wide and consists of several asphalted roads divided by shady walks. This broad, tree-lined street with its multi-storeyed buildings leads to the Khimki River Station and the Central Airport. The Dynamo Stadium, which seats more than 80,000 spectators, is also situated on this street.

A bigger stadium with a bigger seating capacity (over 100,000 spectators) was built in Luzhniki in 1956. A huge ensemble of sports grounds and structures has been constructed there.

In the northern part of Moscow, which only recently was outside the city limits, are the 140-hectare grounds of the Exhibition of Economic Achievement of the U.S.S.R. with lovely pavilions, each built in a different style.

A broad thoroughfare called Peace Prospekt runs from Kolkhoz Square to the Exhibition. It starts at the former Pervaya Meshchanskaya Street with its tall new buildings and then passes over Yaroslavl Highway across the former village of Alexeyevskoye, which was once famous for its taverns. The village and its taverns have been replaced by multi-storeyed buildings that tower on either side of the street.

The tall buildings erected in Moscow have changed the city's appearance. The majestic silhouette of Moscow State University on Lenin Hills can be seen for many miles around. With its spire, it is 240 metres tall. A two-kilometre, double-tier bridge was thrown across the Moskva River in 1958 to provide a through thoroughfare from the Lenin Hills to the centre of Moscow along the new Komsomolsky Prospekt. Tall apartment houses have been built in Vosstaniye Square and on the Kotelnicheskaya Embankment of the Moskva River. The other tall buildings include the offices in Smolensk Square and near the Krasniye Vorota, the hotel close to the three railway stations in Komsomolskaya Square, and the huge *Ukraina* Hotel near the Kiev Railway Station.

The appearance of the centre of the city has also changed. The broad Sadovoye Koltso, a thoroughfare encircling the whole of Moscow's centre, has been reconstructed. Widened and bordered with

new buildings, Gorky Street has lost all resemblance to the old Tverskaya. The huge apartment houses that have been built on it give the impression that they are part of a single architectural ensemble.

The Central Telegraph Office occupying an imposing glass-and-concrete building with a globe over the main entrance is also situated in Gorky Street.

Nothing has remained of the former Okhotny Ryad. There is not a trace of the old merchant stalls. On one side of the wide asphalted street their place has been taken by the big *Moskva* Hotel, and on the other by the monumental building housing the Council of Ministers of the U.S.S.R. Pushkin, Vosstaniye, Mayakovsky and other squares have also been broadened and reconstructed. Instead of the tumble-down little houses that had huddled beyond the Okhotny Ryad, there is now the Manège Square. The huge riding-hall has been re-equipped and converted into the Central Exhibition Hall. Moscow's embankments—along the Moskva River, the Yauza River and the Overflow Canal—have been faced with granite. Big new bridges, which are one of the capital's architectural adornments, span the Moskva River. The Krymsky Bridge is especially beautiful. The magnificent New Arbat Bridge was opened to traffic in 1957.

Moscow has many boulevards, squares and parks. Trees have been planted along the Gorky, Mokhovaya, Teatralny Proyezd and many other streets. The old parks have been improved and new ones have been laid out. The biggest of these is the Central Gorky Recreation Park, which lies in the south-western part of Moscow on a former wasteland near the Krymsky Bridge. It has shady walks, countless flower-beds, side-shows, sports grounds and dance floors, reading-rooms and cafés. More than 200,000 people visit it on off-days in the summer. At the other end of the city is the Sokolniki Park, which is a real forest with cuttings in the midst of the city. The Izmailovo Park on the eastern outskirts is a similar stretch of forest. There are several other parks and a Botanical Gardens.

The population is increasing rapidly as a result of Moscow's tremendous industrial and cultural growth. On the eve of the Revolution there were 1,600,000 people in the city. In 1933, this figure reached nearly three million, and in 1959 it exceeded five million.

A vast housing development scheme is being carried out to take care of this rapid growth of the population. The city's housing space increased from 16,500,000 square metres in 1926 to 35,400,000 square metres in 1956, i.e., it was more than doubled. But the demand is bigger than even what this swift expansion can meet. Housing development has been considerably speeded up with the purpose of eliminating the shortage. By 1960 Moscow is to have additional floor space totalling more than 11 million square metres.

The big permanent population and the colossal stream of visitors made the transport problem acute back in the thirties. The surface transport—trams, buses and trolley buses—could not cope with the demand. A Metropoliten, or Metro, as the Moscow Underground is called, was needed.

The first section of the Metro, covering a stretch of 11.6 kilometres, was opened on May 15, 1935. Since then new lines have been systematically put in operation. To date, the underground railway has a total length of over 65 kilometres and is serviced by 47 stations. In 1956, the Moscow Metro carried more than two and a half million passengers a day.

Passengers reach and leave the Metro stations by escalators. The trains travel at a high speed and follow one another with an interval of one-two minutes. The slopes of the tunnels are gentle and the turns easy to negotiate. There is plenty of light and air in the stations, which, faced with marble and granite, finished with cut glass and bronze, porcelain and stainless steel and adorned with mosaics and sculptures, chandeliers and plafonds, remind one of the palaces in fairy-tales.

Pierre Courtade, the well-known French journalist, wrote: "The Metro of Moscow has changed into a cross-roads of seething life which can in no wise be called 'underground': the pictures that you see in these underground palaces are so vivid. And we, people from abroad, enjoy watching the people who use the corridors of these palaces to go to and from work."

Moscow is the seat of Russian culture.

The Academy of Science of the U.S.S.R., which has its headquarters in Moscow, directs the elaboration of the major questions relating to all spheres of knowledge. Moscow is also the location of a

Kapron department at the Klin Artificial Fibre Mill, Moscow Region

St. Dmitry's Cathedral (1193-1197), Vladimir

number of specialized academies: agriculture, building and architecture, art, medical sciences and pedagogical sciences. The 448 scientific establishments in Moscow include the U.S.S.R. Institute of Experimental Medicine, the Central Aerohydrodynamics Institute, the U.S.S.R. Institute of Thermal Engineering, the Sternberg Institute of Astronomy.

The country's oldest university with its 12 departments, 22,500 undergraduates and more than 1,000 post-graduates is in Moscow. In addition there are 86 other establishments of higher learning training specialists for the entire country. Altogether there are nearly 300,000 students in Moscow. In 1915, Moscow had only 20 establishments of higher learning with an aggregate body of 34,000 students.

The Moscow Lenin State Public Library, which has nearly 20 million books on its shelves, is one of the biggest libraries in the world. Approximately 1,600,000 people use its 26 reading-rooms every year. A new annex has been added to the old building, the former Pashkov House, in Mokhovaya Street. In 1956, the city had 965 public libraries with a total of over 200 million books.

In Moscow, there are more than a hundred museums. Some of them are world famous, especially the State Tretyakov Gallery, where the masterpieces of Russian painting repose, and the Pushkin Museum of Fine Arts. Other world-important Moscow museums include the Central Lenin Museum, the Museum of History, the Museum of the Revolution, the Museum of the Soviet Army and the Polytechnical Museum.

Moscow is the centre of the rich theatrical and musical culture of the Russian people. Theatres such as the Moscow Art Theatre, the Bolshoi Theatre and the Maly Theatre have developed the best traditions of Russian theatrical art, which is world renowned. The Yevgeny Vakhtangov, the Mayakovsky, the Moscow Soviet, the Soviet Army and other theatres came into being in Soviet years. The State Chaikovsky Conservatoire, which is the country's leading institution of higher musical education, is in Moscow.

More than two-score newspapers and many magazines and other periodicals are published in Moscow, where the Soviet Union's biggest publishing houses are concentrated.

Here is what Martin Andersen Nexö wrote about Moscow's impor-

tance as a cultural centre not only for the Russian people but for the whole of modern civilization: "For eight hundred years the name of Moscow has been a symbol of the unification of the Russian State, a symbol of the growing might of the peoples of Russia. But the name of Moscow was never so proud and dignified as it has been in the past thirty years. The Great October Socialist Revolution transformed Moscow into a centre of all that is advanced, flourishing and progressive."

The central industrial region with Moscow at its head was the base of industrial progress in the Soviet Union. At the same time, Moscow had to take the maximum share in carrying out this task because it had the most skilled cadres, the machines and the scientific institutions.

A city of textiles, Moscow speedily became the centre of a modern engineering industry. At the same time, the most difficult branches of the engineering industry, frequently branches that were new to Russian industry, were selected for Moscow. Compared with pre-revolutionary times, the total volume of industrial output increased 57 times by 1957, while that of the engineering industry rose 100-fold.

Through the construction of new factories or the reconstruction of the old enterprises, Moscow came to have big automobile, machine-tool, machine, instrument-making and electrical engineering plants.

Moscow's old factories were reconstructed so thoroughly that big modern factories took the place of the former small semi-primitive enterprises. A vivid example of this is the Likhachov Auto Works, which was an auto-repair and auto-assembly workshop. More than 550 million rubles were spent to reconstruct this workshop, as a result of which the factory is now one of the biggest in Europe. Today, the Likhachov Auto Works produces the comfortable ZIL passenger cars, trucks and buses. Moscow's small-displacement car works puts out the Moskvich car.

Several Moscow's machine-tool factories produce the latest kinds of turning, milling, turret and other lathes. The Bromley Machine-Tool Factory, renamed into the Krasny Proletary, has been reconstructed or rather, to be more exact, built anew. This factory made a large contribution to the development of the Soviet machine-tool industry. Other important Moscow factories are the Orjonikidze Works,

the Machine-Tool Factory, the specialized instrument-making Frezer and Kalibr works, and the Ball-Bearing Works, which ranks among the best in the world.

In Moscow, the electrical engineering industry is represented by the big Elektrozavod, Prozhektor, Elektroprovod and several other factories producing electrical equipment, instruments, radio sets, bulbs and so forth. The Dynamo Works, which makes intricate electrical apparatuses, is fitted with the most up-to-date equipment.

Moscow has watch factories and works turning out computing-analytical machines, precision scales, microscopes and so on.

Machines of every kind bearing the trade marks of Moscow factories can now be found in the remotest corners of Soviet Russia.

Moscow sends to all parts of the country not only machines but also workers, engineers and technicians, who help to train skilled workers and specialists from among the local population.

Development of the engineering industry in Moscow required an all-sided strengthening of the local iron and steel base. The capital's machine-building enterprises get their steel from the reconstructed Serp i Molot Works of Moscow, and their pig-iron castings from the Stankolit Plant. A big factory, the Elektrostal Works, producing high-grade steel from scrap, has been built in Noginsk District close to Moscow. Near Tula, the old Kosogorsk Works has been reconstructed (a third blast-furnace has been built) and the Novotula Works, which has two blast-furnaces, has been commissioned. These two factories use the iron ore mined around Tula and supply foundry pig iron to the engineering factories in Moscow.

However, the output of these factories does not fully meet the requirements of Moscow's engineering industry and for that reason Moscow receives additional metal from the southern and the Urals iron and steel works.

The chemical industry in Moscow has expanded immensely chiefly through the extension and reconstruction of enterprises that had existed prior to the Revolution. Among them are the Dorogomilovo and Derbenev aniline dyes factories, the Krasnaya Presnya Lacquer Paints Works, the Kauchuk and Krasny Bogatyr rubber factories, and perfumery and soap factories. The products of these factories go to all parts of the country.

Moscow's light industry is developing side by side with the heavy industry. Among the numerous textile mills, the biggest is the Trekhgornaya Manufaktura in the Krasnya Presnya District, the First Print Works, the large broadcloth mills and the Krasnaya Rosa Silk-Weaving Mill. Big mechanized sewing, knitted-goods and foot-wear factories have been built.

The requirements of the capital's population could never have been met by the small food enterprises inherited from old merchant Moscow. The setting-up of a big food industry was necessitated by the rapid growth in consumption that is linked not only with the increase in the population but also with the rising prosperity of the people and the higher standard of living.

The Mikoyan Meat-Packing Plant, which has been built in accordance with the last word in engineering, occupies an outstanding place in the city's food industry.

The supply of milk and fresh dairy products for the population has likewise been organized on a large-scale, industrial basis. Three new milk plants daily process more than half a million kilograms of milk.

Many of the capital's food enterprises produce more than is needed by the population. The Krasny Oktyabr Confectionery, the Dukat and Yava tobacco mills and some of the wine-making plants send their products all over the country and export them abroad.

More than a million workers and employees, including 107,000 engineers and technicians, are engaged in the 1,500 industrial enterprises in Moscow.

Tremendous power resources are needed to run the many enterprises and satisfy the municipal requirements of Moscow and its suburbs. Numerous power stations feed the Moscow Power System through transmission lines. Moscow is already getting electricity from the Kuibyshev Hydropower Station and it will soon be receiving energy generated by the Stalingrad Hydropower Station. This will allow extending the electrified railways running from Moscow and providing power for industry and farming round the city.

Growing importance is being attached to district heating systems. These systems generate electric power and supply hot water for heating houses, thanks to which great quantities of fuel are saved and the sanitary condition of the city is improved. The Frunze and Stalin

plants are the biggest district heating systems in Moscow. Extension of the heating system is keeping pace with the rapid housing development in Moscow.

Gas is playing an increasingly important role in the reconstruction of the capital's fuel and power economy. The Saratov-Moscow gas line, which pipes gas from the Volga Area, was completed in 1947. Ten years later, a longer line stretching from Stavropol to Moscow began supplying the capital with three-four million cubic metres of gas a day. After the city's gasification is completed it will no longer require solid or liquid fuel for heating and industrial purposes and this will do away with smoke and soot, which are inevitable when coal and oil are burned, and will economize on labour and improve living conditions.

The Moscow Canal, which was commissioned in 1937, plays an important role in the life of the capital. It is 128 kilometres long and 5.5 metres deep and links the Moskva River up with the Volga.

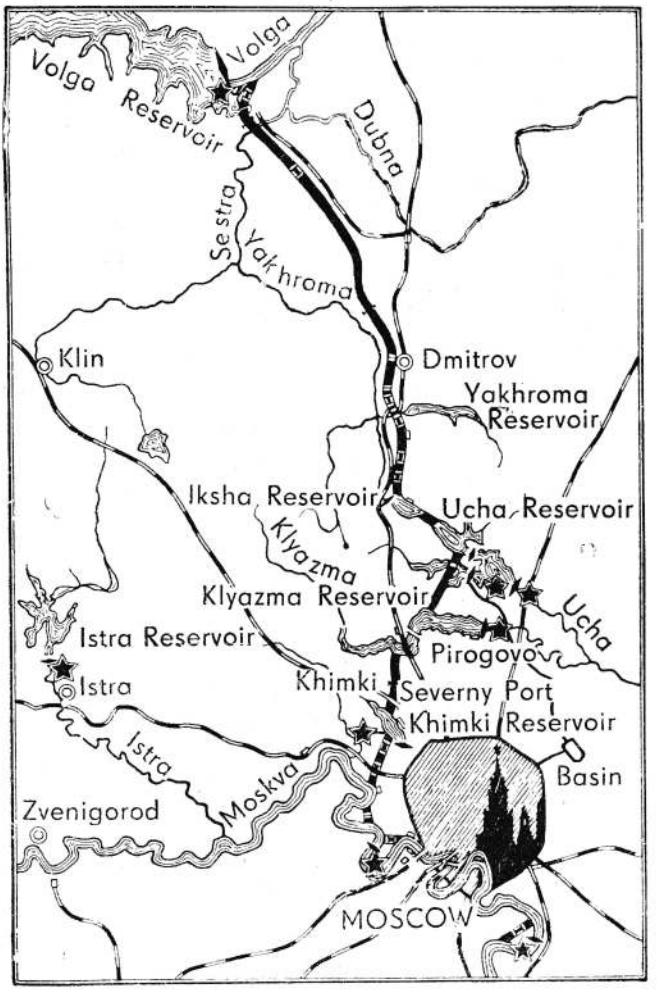
The canal starts on the right bank of the Volga, at the village of Ivankovo, where a dam raises the level of the water and forms the Volga Reservoir, a lake of more than 300 square kilometres which is known as the Moscow Sea. This big reservoir keeps the water in the canal at a steady level. Southwards, in the direction of Moscow, the canal cuts through a considerable tableland with the aid of nine locks. Powerful pumping stations raise the water. Along the canal there are eight hydropower stations which generate electricity for the Moscow Power System.

This structure embodies the principle of making complex use of water resources. The canal simultaneously solves the capital's water-supply, water transport and power problems.

The Moskva River could not satisfy the water requirements of a growing city and there was the danger that the population would "drain" the river down to the last drop. This problem was solved by the Moscow Canal as it provides the city with 250 million pails of pure Volga water daily, which is several times more than what was formerly obtained from the Moskva River.

Moreover, the canal is of great importance in the plan of establishing a single system of water transport in the European part of the

MOSCOW CANAL



R.S.F.S.R. It reduced the waterway from Moscow to Gorky by 110 kilometres, and to Leningrad by 1,100 kilometres. Moscow now has the shortest water route to the Caspian via the Moscow Canal, to the Baltic Sea via the Volga-Baltic route (the Mariinskaya System) and to the White Sea via the White Sea-Baltic Sea Canal. When the Volga-Don Canal was opened, Moscow received access by a water route to the Sea of Azov and the Black Sea and became a port linked up with five seas.

Cargoes carried by the canal account for 90 per cent of the freight turnover at Moscow ports (the North Khimki and the Southern). These cargoes consist mostly of building materials, timber, salt, and farm produce. Outgoing vessels carry the products of Moscow's industry.

All the structures on the canal are really beautiful. The dams, locks and pumping stations are a pleasure to the eye. A trip along the canal and farther along the Volga in comfortable white diesel-electric ships skimming over the water between green banks is splendid recreation and is attracting a growing number of tourists.

Eleven trunk railways converge in Moscow. Among themselves they are connected by the city ring railway and the second ring railway that runs within a radius of 80-100 kilometres from the capital. Together with the numerous branch lines, these roads create a dense network of railways around Moscow. Moscow Region has the densest system of railways in the R.S.F.S.R.; almost all its administrative districts are crossed by railway lines.

In Moscow there are nine passenger railway stations, 11 marshalling yards and dozens of freight railway stations.

In the suburbs the railway traffic runs on electricity. All trunk lines in Moscow Region will be electrified within the next few years.

Several motor highways fan out from Moscow: southwards, to the western borders, eastwards, and to the north-west. Moscow is also the main airways junction of the R.S.F.S.R. and of the whole of the Soviet Union.

The suburbs lie within a radius of 50-70 kilometres from the capital. Around Moscow, along the railways and highways there is an almost unbroken line of factories and plants, workers' townships and settlements of summer cottages, warehouses and transport struc-

tures. More than a quarter of this territory is under construction sites and roads.

Numerous satellite-towns surround the capital, almost merging with it. These include towns like Perovo, Kuntsevo, Babushkin, Mytishchi and Lyubertsy. Prior to the Revolution, they were small settlements with populations of not more than 2,000 or 3,000 people. In Soviet years, they grew rapidly after industrial enterprises were built in them. Today, they are big towns with populations of tens of thousands of people. Many of the inhabitants of these towns work in Moscow.

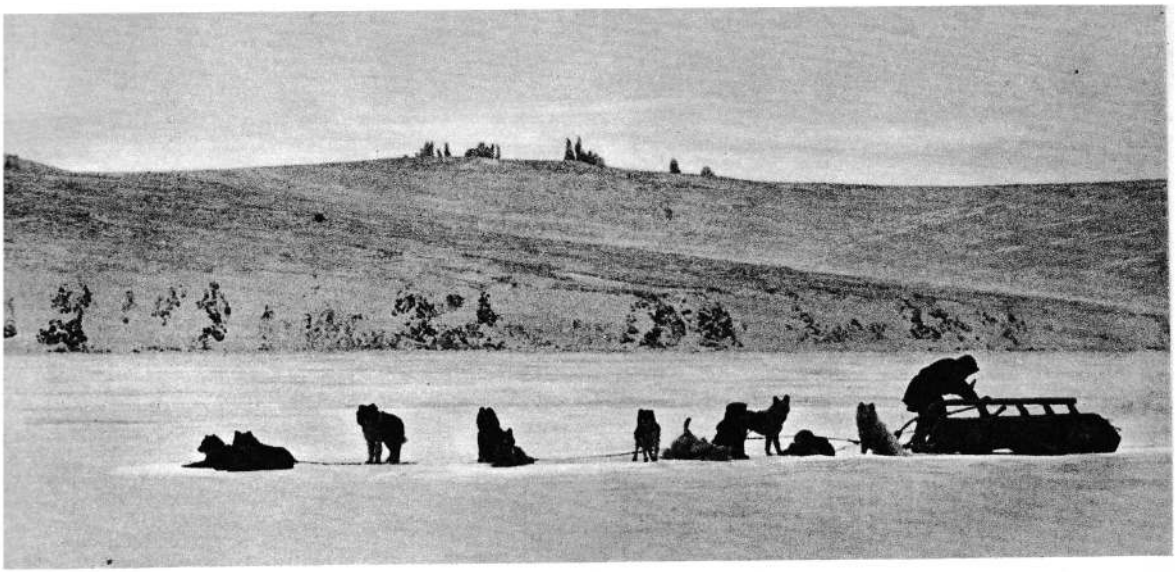
Moscow is surrounded by a ring of state- and collective-farm fields, truck gardens, hothouses and livestock farms which supply the city with potatoes and vegetables, hard and soft fruits, milk and meat. Sewage from Moscow is widely used as a fertilizer for the fields. In the sewage-irrigated fields around Lyubertsy, the collective and state farms grow bumper harvests of vegetables.

The landscape changes as it recedes from Moscow. The forests become denser. They are looked after and form a green ring round the capital. The serenely beautiful landscape in the suburbs of Moscow consists of a broken relief, an abundance of mixed forests and the picturesque banks of the Moskva, Klyazma, Pakhra and Istra rivers.

The celebrated Russian painters Isaac Levitan and Vasily Polenov captured the lyrical charm of the Moscow suburban landscape on their canvases.

In an article entitled "Christened Property," the Russian author and publicist Alexander Herzen wrote: "Our stern northern landscape has a moving charm that is especially dear to us.... Our endless and evenly green meadows are soothingly beautiful; there is something peaceful, trustful and unsophisticated in our spreading landscape ... a something that is sung about in Russian songs, that finds an ardent response in the Russian heart...."

Moscow's environments attract many people, both holiday-makers and excursionists. There are countless summer cottages and numerous sanatoriums and holiday homes. This is especially the case with the more picturesque districts such as Zvenigorod and the Istraside. The district around Zvenigorod is justly called the "Russian Switzerland."



Chukotka, the Far North

Moscow suburban landscape

Moscow University

When we speak of Moscow's suburbs we cannot pass over the remarkable relics of Russian culture that have been preserved in these places.

The village of Kolomenskoye, which has been known to exist since 1339, stands near Moscow on the highland right bank of the Moskva River. This ancient village witnessed many a historical event and has several historical and architectural monuments. One of them is the Church of the Ascension. Built in 1532, it is situated on a high hill overlooking the river and affording an excellent view of the vicinity. The tall cupola (it is nearly 70 metres high) of this church could be seen from the Ivan the Great Belfry in the Moscow Kremlin and in the old days it served as a military observation post of the "fire telegraph" that followed the movements of the Tatars. During the day the approach of the Tatars was reported by a smoke signal, and during the night—by a fire.

This church is amazing not only for its height but also for the beauty of its architecture. Louis Hector Berlioz, the French composer who visited Russia in the eighteen forties, wrote: "Nothing has ever impressed me so much in my life as the monument of ancient Russian architecture in the village of Kolomenskoye. I have seen much, admired much and much has amazed me, but the times, the ancient times in Russia, which have left a memorial in this village, were a miracle of miracles so far as I was concerned. I have seen the Strasburg Cathedral, which was built in the course of centuries, stood near the Cathedral in Milan, but I saw nothing save stuck-on decorations. But here in front of me I saw beauty which made me tremble. There was a mysterious silence. The harmony of the perfect outlines was exquisite. I saw a kind of architecture that was completely new to me. I saw an aspiration for height and, stunned, I stood there for a long time."

Zvenigorod, founded in the 12th century, is one of the oldest towns in Russia. There, the Cathedral of the Assumption, built of local limestone in about 1400, stands on a precipice over the Moskva River. This cathedral is the only monument of 14th-century Russian architecture that has remained intact in almost its initial form. The Savva-Storozhka Monastery, founded in the late 14th century, is located two kilometres away from Zvenigorod on the tall bank of the

Storozhka River, which drains into the Moskva River. It is a valuable monument of history and art.

Near Moscow, on the Moscow-Riga Railway, on the bank of the lovely Istra River, a tributary of the Moskva, stands the town of Istra with its historical and architectural monument of the 17th century—the Monastery of the Resurrection which is also called New Jerusalem. The central building in it is the Cathedral of the Resurrection, which was completed in 1685. Bartolomeo Rastrelli was one of the many prominent architects who helped to alter the Cathedral in the 18th century. Damaged by the invaders during the Second World War, the cathedral is now being restored.

Anton Chekhov lived for a few years in Istra and in the neighbouring estate of Babkino.

Ostankino, the former palace-estate of Count Sheremetyev, is one of the most interesting monuments of Russian culture. The palace was built in the 18th century by the serf architects Pavel Argunov, Alexei Mironov and Grigory Dikushin. All the amazing interior decoration—the artistic parquet floors, the furniture, the chandeliers and the paintings—was the work of serf artists and craftsmen. They are splendid examples of the art of the Russian people, who created masterpieces of art even under the harsh conditions of serfdom. This palace is now a museum.

In picturesque woods along the Yaroslavl Railway north of Moscow is the estate of Abramtsevo, which belonged to the author Sergei Aksakov in the mid-19th century. During Aksakov's life-time, the estate was visited by Mikhail Shchepkin, Ivan Turgenev, Nikolai Gogol and many other prominent Russian writers and actors. In 1870, the estate was bought by the well-known patron of art Savva Mamontov, who placed it at the disposal of Mark Antokolsky, Victor Vasnetsov, Mikhail Vrubel, Mikhail Nesterov, Vasily and Yelena Polenov, Ilya Repin, Valentin Serov and other outstanding Russian painters. The Abramtsevo landscape appears in many of their paintings. At present the estate is a museum of the U.S.S.R. Academy of Science.

Near Abramtsevo is Muranovo, the former estate of the poet Yevgeny Baratynsky, who often played host to Nikolai Gogol, Fyodor Tyutchev and other great writers.

In Moscow's suburbs there are other notable places which are linked with extremely interesting pages of Russian history and culture.

Moscow and its suburbs are one of the chief components of Moscow Region, which is among the leading industrial regions in the R.S.F.S.R. Heavy industry accounts for nearly two-thirds of the industrial output of Moscow Region. The region also has a big light, particularly textile, industry. By 1956, Moscow Region's total output increased 34 times compared with the pre-revolutionary level, while the output of the engineering and metal-working industries increased 200 times. The big industrial enterprises that have been built in the region include the Elektrostal Iron and Steel Works, the Kolomna Machine-Tool Factory which produces heavy machine-tools, the Kolomna Locomotive Works, which recently began turning out powerful electric locomotives, the Podolsk Engineering Plant, the Mytishchi Engineering Plant, and the Lyubertsy Farming Machinery Works.

The old enterprises in Moscow Region have been fundamentally reconstructed. For example, the Podolsk Machine Works, which formerly only assembled sewing-machines from parts imported from abroad, now produces these machines.

Much of Moscow Region's electricity for industrial and domestic use is generated by the Stalinogorsk, Kashira, Shatura and Orekhovo-Zuyevo thermal-power stations.

East of Moscow is a large group of towns with a highly developed textile industry. Prominent among these is the town of Orekhovo-Zuyevo with a population of over 100,000. After Moscow, it is the second seat of the region's textile industry.

Moscow and Moscow Region are the nucleus of the Centre, which is a major economic region in the Soviet Union. This region is situated in the Great Russian Plain between the Oka and the Volga and occupies the huge territory of 1 million square kilometres. This plain is not quite flat. Lowlands alternate with highlands some of which attain an elevation of 500 metres. The most prominent of these highlands are the Sredne-Russkaya, which lies to the south of Moscow, and the Volgaside, which stretches along the middle reaches of the Volga. The northern part of the Great Russian Plain is adjoined by the Valdai Hills.

The sources of raw materials in the Centre include the Moscow Brown-Coal Basin, the rich iron-ore deposits of the Kursk Magnetic Anomaly[1] and the great deposits of peat in Moscow Region. In a few years the iron ore from the Kursk Magnetic Anomaly will be an important source of raw material for the iron and steel factories of the Centre. An iron-ore deposit with reserves that are no smaller than those of the famous Krivoi Rog Iron-Ore Basin was discovered in 1957 near the village of Yakovlevka.

The main role in the Centre's economy is played by the engineering, high-grade metallurgical, electrical engineering, chemical, electric power, light and food industries and by intensive farming.

Some of the industries in the Centre account for a very large share of the industrial output of the Russian Federation. They produce a considerable part of the automobiles in the R.S.F.S.R., more than half of the metal-cutting lathes, nearly 24 per cent of the steam boilers, nearly a quarter of the peat, approximately 17 per cent of the coal and over a quarter of the electric power. The share contributed by the textile industry is likewise very big. The Centre produces 91 per cent of the Russian Federation's cotton fabrics, about 82 per cent of the woollen fabrics, more than 87 per cent of the linen and 92 per cent of the silk. The food industry turns out large quantities of granulated sugar (more than 85 per cent of the Russian Federation's output), butter (33 per cent), meat (35 per cent) and confectionery (42 per cent).

The highly-developed industry of the Centre consumes a huge quantity of fuel, the demand for which is continuously rising with the result that there is a disproportion between the expanding industry and the fuel and power resources. This problem is being solved by increasing the coal output of the Moscow Basin and by extending the uses of peat, combustible shale and other local sources of energy. In the development of the Centre, one of the cardinal economic tasks is to ensure the maximum supply of coal, oil, gas and electric power from areas with plentiful reserves of fuel and power. To a large extent this task will be carried out with the help of gas pipes

[1] In Kursk Region there are such huge accumulations of iron ore at a depth of 150-200 metres that they noticeably influence the compass needle, causing it to deflect.

stretching from the Volga Area, the North Caucasus and the Ukraine and electric transmission lines from the Kuibyshev Hydropower Station.

The vast territory of the Centre falls into four parts: southern, central, western and eastern. The southern part is covered with rich black soil, or chernozem, and is known as the Central Chernozem Region. It embraces Voronezh, Tambov, Lipetsk, Orel, Kursk and Belgorod regions. These are old agricultural areas but today they have rapidly developing industries. The cities of Voronezh, Kursk and Orel have become important industrial centres.

Voronezh, which has a population of 454,000 people, is the biggest city of the Central Chernozem Region. It manufactures the powerful Voronezhets drag-lines, farming machines, bridge elements, equipment for the mining industry, and TV and wireless sets. As in the other cities of the Centre, the development of synthetic chemistry is being promoted on a big scale. Voronezh has factories producing synthetic rubber, automobile tyres and pharmaceutical wares. It also has a highly developed industry processing the abundance of agricultural raw materials in the area.

We cannot overlook Voronezh's importance as a cultural centre as well. It has a university and other institutions of higher learning, and cultural establishments, including one of the oldest theatres in the country. The Voronezh Folk Choir is widely known.

Although industry is at a high level of development, the Central Chernozem Region is primarily an agricultural area producing grain and industrial crops with especially large tracts under sugar-beet, sunflower, hemp, oil-seed crops and *makhorka* tobacco. Kursk is the chief sugar-beet region. Great quantities of potatoes and other vegetables are also produced. Animals are bred mainly for meat and dairy purposes.

The main seat of industry in the Centre is what is known as the Central Industrial Region: the Moscow, Vladimir, Ivanovo, Kostroma, Yaroslavl, Kaluga, Tula and Ryazan regions.

This Old Industrial Centre, as it is called, is extremely important. This is the most densely populated area of the U.S.S.R.

Moscow Region, which we have already described, is the leading industrial territory of this Old Centre.

Tula Region also has a highly developed industry with the metal-working industry playing the leading role. The ferrous metals industry in this region is represented by the already mentioned Kosogorsk and Novotula factories. The city of Tula is a big centre of the engineering industry producing potato harvesters, snow-removers, mining equipment, machine-tools, presses, motor cycles and other machines. In the town of Yefremov there is a big synthetic-rubber plant.

When Tula Region is mentioned we involuntarily think of Yasnaya Polyana, a name known to the whole of progressive mankind. This estate, situated near Tula, is where the great Russian writer Lev Tolstoi was born, lived and worked, and this is where he is buried. Today, Yasnaya Polyana is a literary and memorial museum.

Until recently, Ryazan Region was one of the industrially backward areas of the Industrial Centre. This lag was done away with when a large machine-tool works and other engineering enterprises were built in the city of Ryazan.

Yaroslavl, which lies where the Moscow-Arkhangelsk Railway and the Volga River intersect, is one of the major cities of the Industrial Centre. It was founded in the early 12th century.

Formerly, Yaroslavl developed mainly as a centre of the light and food industries. Textiles were the dominant item of manufacture and Yaroslavl was known as a city of weavers. In the years following the Revolution, it came to be an important centre of the heavy industry—engineering and synthetic chemistry. The Yaroslavl Automobile Works is one of the firstlings of the automobile industry in Soviet Russia. It specializes in heavy trucks. At present it is producing seven-ton trucks, buses and trolley buses, and the powerful YAZ-214 truck which pulls 50-ton-capacity trailers. Yaroslavl also produces electric motors and other machines.

Development of the automobile industry in Yaroslavl itself and the city's location on rail and waterways, which link it up with the chief consumers of automobile tyres—Moscow and Gorky—and with the raw-material areas, have made it expedient to build a big rubber and asbestos combine in that city. This combine consists of tyre, synthetic-rubber, asbestos and rubber-technical factories. The tyres produced in Yaroslavl are known for their superior quality.

Yaroslavl has two lacquer-paints factories, which were built on the bases of small old enterprises. The lacquers, paints and enamels they produce are consumed by automobile and other machine-building works.

The city's traditional industries—textile, food and wood-working —have developed side by side with the heavy industry. However, in conformity with the altered pattern of industry in the city, this industry has changed its specialization and instead of coarse calico and cotton cloth produces industrial fabrics for the tyre and other heavy industries. A cord factory has been built to meet the requirements of the tyre industry.

Industrial development was accompanied by a considerable growth of Yaroslavl's population. In Soviet years it increased more than three times, reaching the figure of 406,000 in 1959.

Yaroslavl's cultural importance has also grown considerably. It has four institutes—pedagogical, medical, technological and agricultural—and several technical schools—rubber industry, chemical engineering, automobile engineering, textile and others. The dramatic theatre bears the name of Fyodor Volkov, founder of the first Russian theatre in Yaroslavl in 1750.

Many monuments of ancient Russian architecture have survived in the city. But old Yaroslavl is steadily retreating in the face of new projects. The new life is most strikingly evident in the northern part of the city where a huge industrial district has sprung up. Suffice it to say that in post-revolutionary years the city's territory has increased ten times, while the riverside line has lengthened from 12 to 29 kilometres.

Below Yaroslavl, on the high left bank of the Volga, stands the ancient town of Kostroma with its Ipaty Monastery. This town is associated with memories of the patriotic exploit performed by Ivan Susanin, which has been immortalized by the music of Mikhail Glinka. Today, Kostroma is an important centre of the engineering and flax-weaving industries.

North-eastwards from Moscow, the road leads to the domain of the textile industry, the city of Ivanovo, the "Russian Manchester," with the textile centres of Shuya, Vichuga and Rodniki around it. This location of the textile industry in a large cluster has its histor-

ical reasons. The crafts that had taken shape here were the basis on which a scattered capitalist textile industry grew up. Small mills were built in almost every village and ruined craftsmen sought employment in them. These mills gradually expanded and villages were transformed into industrial towns. At present, Ivanovo Region yields almost 30 per cent of the cotton and staple fabrics produced in the U.S.S.R.

The village of Palekh, situated near Ivanovo, is famous throughout the world.

The skill of the Palekh craftsmen in decorating caskets, artistic snuff-boxes and porcelain with miniature painting is incomparable. They are past-masters at illustrating books and producing patterns for fabrics. The Palekh masters restored the ancient wall-paintings of the Moscow Kremlin. The Soviet Government gave every encouragement to this art which was faced with the threat of a decline. An art technical school and a state museum have been opened in the village.

Vladimir, one of the oldest Russian cities, lies half-way between Moscow and Gorky. It was from this older sister that Moscow took over the leadership. Many magnificent monuments of old Russian architecture have been preserved in Vladimir to this day. The Cathedral of the Assumption in Moscow was modelled after one of Vladimir's cathedrals.

Prior to the Revolution, this was a sleepy provincial town, whose only products were cotton fabrics and the nationally famous Vladimir cherry. Today, this town is a big regional centre with highly developed industries manufacturing textiles, automatic apparatuses, plastics and gramophones. A big tractor works was built there during the war.

In the Central Industrial Region with its big urban population, agriculture specializes chiefly in potatoes and other vegetables, and in dairy products. Lately, much attention has been given to maize as the most profitable fodder crop. Unproductive land is being intensively developed for farming. Within the next few years, for example, huge tracts of land will be reclaimed in the Meshchera Lowland, which embraces a considerable portion of Ryazan and Vladimir re-

gions and a part of Moscow Region. More than 100,000 hectares of unproductive land will be developed in Vladimir Region alone.

The western area of the Centre includes Kalinin, Velikiye Luki, Smolensk and Bryansk regions. Like the other areas of the Centre, it lies in the Great Russian Plain and occupies a part of the Valdai Hills. Because of its geographical position, this is an important transit area with the roads to the Baltic republics and Western Europe running through it. Here the most important industries are engineering, textiles and wood-working, while flax- and sugar-beet-growing and dairy husbandry are the chief branches of farming. Prominent among the towns are Bryansk with its big engineering factories, Smolensk, an ancient Russian town that is a major flax-processing and wood-working centre, and Kalinin with its big textile mills.

The eastern part of the Centre embraces the Mari, Chuvash and Mordovian autonomous republics and Gorky and Kirov regions. Here the timber industry is especially well developed, while flax is the chief crop.

Gorky Region is the most important area here. The home of the Soviet engineering industry, this is one of the leading industrial regions of the country. The major branches in this region are the automobile, ship-building, machine-tool and chemical industries.

The regional centre, the city of Gorky, was formerly called Nizhny Novgorod but was renamed in honour of its great citizen, the writer Maxim Gorky. For its population, it is the third biggest city in the Russian Federation (after Moscow and Leningrad). In 1959, it was inhabited by 942,000 people.

Situated where the Oka joins the Volga, it stretches for 20 kilometres along both banks of the Oka and along the right bank of the Volga. Its relief is varied: on the right bank of the Oka and the Volga it stands on high ground, but the districts on the left bank of the Oka are low-lying and only recently used to be inundated by the Volga.

Thanks to its advantageous geographical position, it became a junction on the Volga and a ship-building centre back in the 19th century. The Sormovo Ship-Building Yard, now called the Krasnoye Sormovo Works, is the biggest enterprise of its kind on the Volga

and builds passenger vessels, tugboats, motor ships, metal barges and oil tankers for the Volga Basin, and sea-going schooners for the Caspian. It also makes powerful diesel engines for river and sea vessels, as well as railway and tram carriages and freight cars. Krasnoye Sormovo's wheel-rolling department meets the demand of many carriage-building works.

Gorky's giant automobile works stands on the Oka. In the course of many years it produced the well-known Pobeda and other passenger cars. The Pobeda has given way to the more modern Volga, and the works has started the production of the comfortable Chaika. In the city there are quite a few big and well-equipped metal-working factories.

The concentration of these factories in Gorky made it imperative that high-grade steels were produced locally. For this purpose open-hearth furnaces were built at the large engineering works. In addition, the Gorky factories receive high-grade steels from the metallurgical plants in the Oka towns of Vyksa and Kulebaki and also from the Urals.

Gorky has an oil-refinery, as well as wood-working, silicate and food industries.

This city is an important river port, railway junction and transshipping point on the Volga. The Gorky-Kotelnich Railway was completed after the Revolution, while direct communication with the Urals and Siberia was opened in 1934 when a railway bridge was thrown across the Volga. The Gorky port occupies a big territory. Its wharves and moorages stretch for ten kilometres along the Volga and for six kilometres along the Oka. Large warehouses line the bank. Machines are doing more and more of the loading and unloading, and the back-breaking labour of the Volga stevedores is a thing of the past.

Industrial progress and the attending tremendous increase in the population gave rise to large-scale housing and municipal development. First and foremost, this concerns the new, Oka industrial district where numerous modern apartment houses have been built. In this district there also are many educational establishments, libraries, shops and restaurants, polyclinics and hospitals, and other institutions catering for the needs of the population. The Sormovo Pal-

ace of Culture with the splendid park near it are also in this part of the city. This district is linked up with the "old" city by a bridge built near the mouth of the Oka in Soviet years.

The "old" city itself has expanded considerably. Many new public buildings and apartment houses have appeared in it. The new House of Soviets is in the ancient Nizhny-Novgorod Kremlin and the lower and upper Volga esplanades have been reconstructed. However, quite a few old buildings have remained and these include the fair structures with their arcades, stalls and corn-chandler's shops.

Prior to the Revolution, Nizhny Novgorod did not have a single institution of higher learning. To receive a higher education, Maxim Gorky had to go to Kazan. At present Gorky has a university, more than 10 institutes, research establishments, a big public library, a splendid local lore museum, and theatres.

When viewed from the Volga, the city is a picturesque sight. The old kremlin towers that have been restored a few years ago rise above the steep bank. This place on the Volga is called the Otkos. Above it, on the sheer bank, is a monument to the famous flyer Valery Chkalov. A huge granite staircase leads to the riverside from the Otkos. This spot is popular with the people of Gorky, for the picture that opens up from here is beautiful and imposing. On the banks of the mouth of the Oka and higher up along the Volga the panorama is of an industrial city. On the water there always are scores of incoming and outgoing passenger and cargo vessels. Life seethes here. On the opposite bank an endless forest recedes into the haze.

The Kerzhenets Forests stretch in a broad belt along the Kerzhenets River, a tributary of the Volga. Khokhloma, the home of folk painting, is situated here. The Khokhloma painted wood-ware is widely known thanks to their life-asserting character and beauty of the paintings. Most frequently they are portrayals of flowers and leaves on a gold or black background fringing stylized birds and animals. This is called "flame" painting. Local people say that "Khokhloma began with an earthen saucer and a wooden spoon." With time the ware became more varied and the Khokhloma craftsmen began to adorn vases, children's furniture and other wooden objects.

The eastern regions of the Centre are inhabited by peoples who, it may be said with all justification, began their real national exist-

ence only in Soviet years. National autonomy was received by the biggest of these peoples; three autonomous republics—Mari, Chuvash and Mordovian—were formed. The cultural achievements of these peoples are exceptionally noteworthy. Illiteracy which was widespread before the Revolution has been completely wiped out. Universal education, which is conducted in the native language, has been made compulsory. These republics have their own institutions of higher learning, numerous technical schools, clubs, libraries, Houses of Culture and national theatres.

Great progress has been achieved in developing industry and agriculture. Prior to the Revolution, these areas were "famous" for the lowest harvests in Russia. Collectivization and the availability of the most diverse machines have led agriculture out of what seemed to be a hopeless situation. The yield of the grain crops became higher and the crop areas were extended. Industrial crops began to be cultivated. This served as the foundation for building factories processing agricultural raw materials. The output of animal products increased.

A big timber-felling industry with sawmills and wood-working factories has been built up in the Mari Autonomous Republic, which lies amidst dense spruce and fir forests on the left bank of the Volga below the city of Gorky. The new town of Volzhsk has a large paper and cellulose works. A railway has been built to the capital, the town of Yoshkar-Ola.

The Chuvash Autonomous Republic is situated on the opposite bank of the Volga. Prior to the Revolution, the Chuvash people were, if possible, even more unfortunate than the Maris. They grew rye and oats on meagre patches of land and felled timber. Today, wheat, potatoes and hemp are grown in the republic and there are developed light and wood-working industries. Chuvashia is famous throughout the country for its model roads. A railway runs to Cheboksary, the capital.

The Mordovian Autonomous Republic occupies the black earth forest-steppe between the Volga and the Oka, the Sura and the Moksha. Its industry is based chiefly on the output of agriculture and on the wealth of timber. There are many enterprises of the food and light industries in the capital, Saransk, and in the farming areas.

NORTH-EUROPEAN PART OF THE R.S.F.S.R.

On a few pages it is difficult to give more than a brief description of the European North of the Russian Federation, of its stern beauty.

This is a land where sharp-edged, piercing blizzards rage during the long polar night and Aurora Borealis sparkles on the horizon, where the unbounded tundra and stately forests conceal truly inexhaustible wealth whose development began with the October Socialist Revolution. One cannot help but recall Fridtjof Nansen's prophecy that "...here, in the North, is the future of the Earth, here we find beauty...."

The North-European part of Russia occupies a territory of more than 1,140,000 square kilometres and lies in the high altitudes. In the south it crosses the 60th parallel, while in the north it reaches far into the Arctic Circle. It is situated on the same latitudes as the Scandinavian countries, the southern part of Greenland, and Alaska. The city of Arkhangelsk is on approximately the same parallel as Reykjavik, capital of Iceland. Glasgow, the northernmost of the big towns of Great Britain, is four degrees south of Vologda, the southernmost of the big towns of the Soviet European North.

Approximately half this territory—more than 50 million hectares—is under high-grade coniferous forests. This natural feature gave shape to the economic specialization of the European North as a timber-producing territory. Its timber, cellulose and paper, and timber-chemistry industries are highly developed.

Forests are the characteristic feature of the northern landscape. Vast expanses of forest interrupted only by towns, settlements or river valleys stretch in all directions. In the Extreme North, the forest gives way to the sombre tundra with its mosses and dwarf trees.

It is very humid in the northern forests. In the stern climate the faint evaporation transforms these forests into a colossal "storehouse of moisture." The excessive humidity of the North, the great forests and the flat relief which prevents the water from draining away have covered the country with marshes. It is estimated that bogs cover at least two-thirds of the territory. Most of the marshland is in the northern part of the forest zone and in the forest-tundra.

Rivers that play a tremendously important role in the life of the North rise in the peat bogs of the forests. The continental part of the Russian European North is the basin of several big rivers flowing to the seas of the Arctic Ocean. They are the Onega, the Northern Dvina and the Mezen, which drain into the White Sea, and the Pechora whose outlet is the Barents Sea.

The biggest of these rivers, the Pechora, is 1,790 kilometres long and its basin, the Pechora Lowland, occupies a territory of 327,000 square kilometres. During the spring floods, its low-lying banks almost completely disappear from view. But even when it returns to its banks, it is two kilometres wide in its lower reaches. The Pechora is quite navigable in spite of the shifting sandbanks and the numerous islands that break the river-bed into many channels. Cargo and passenger vessels ply the river for four or five months in the year, during which time timber is also rafted. The Pechora's mean annual drainage is half that of the Volga and the power resources of the basin exceed a million kilowatts.

Although the Pechora is more than two times longer than the Northern Dvina, the latter is the chief river of the North. It is more navigable and its basin occupies a third of the entire territory, the southern and western parts having the greatest forests.

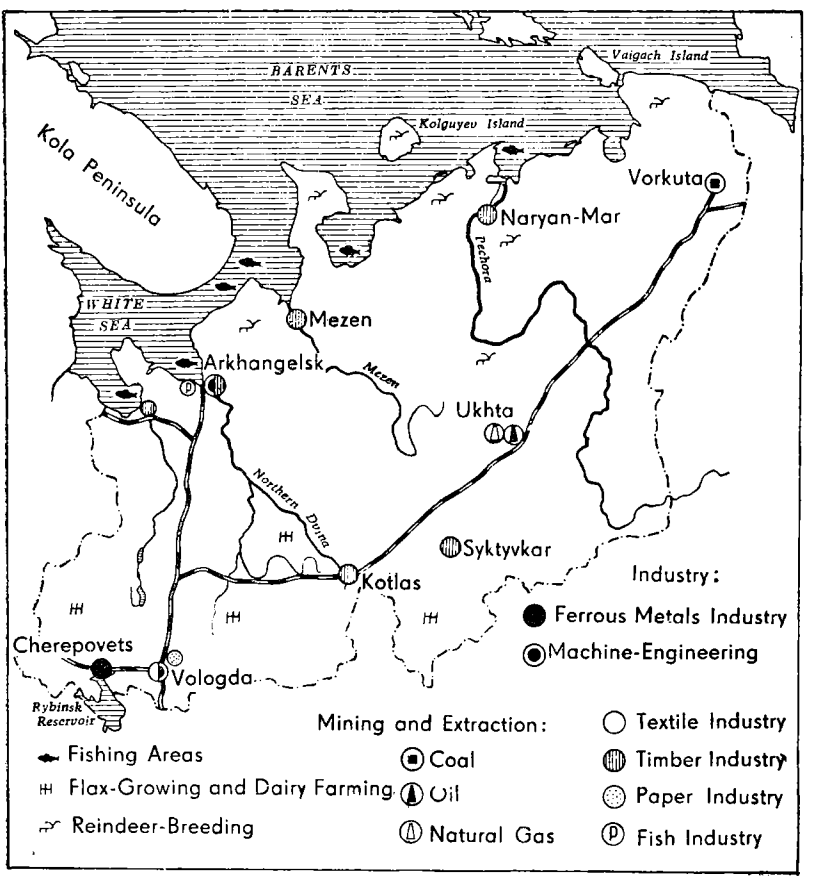
The interminable tundra with its hills and knolls lies within the Arctic Circle. The hills mark the route of ancient glaciers. A tundra of lichens and moss predominates along the seaboard. Southwards this is replaced by shrubs and mounds. Still further south, on the parallel of the Arctic Circle, the landscape is dominated by a forest-tundra with first a preponderance of birch-trees and then, where the tundra finally meets the taiga, of coniferous trees.

An eternally frozen layer of earth has been lying for millenniums beneath the soil of the huge expanses of the Extreme North. There are stretches with fossil ice, which scientists believe to have survived from the glacial epoch.

The Barents, White and Kara seas are an important factor in the life of the North.

Geologically, the White Sea is regarded as being young. It did not exist in the glacial epoch and the entire hollow was filled with ice which formed a cold sea as it melted. Then the hydrological condi-

NORTH-EUROPEAN PART OF THE R.S.F.S.R.



tions changed and only a few thousand years ago there was a sea that was much warmer than the White Sea of today.

All this has influenced the fauna of the White Sea, which in that respect is considerably richer than the other seas of the Arctic Ocean. Almost all marine animals are represented here. The sea is rich in fish like herring, plaice, salmon and navaga. But its principal riches consist of marine mammals. Hunting and fishing were the chief occupations of the inhabitants of the North since time immemorial. The Greenland seal, of which there are six to seven million head in the White Sea, and the white whale are the chief mammals hunted in this sea.

In recent years, the flora of the White Sea has been acquiring increasing industrial importance. On the sea-bed there are all sorts of weeds—soft, hard, ball-shaped or resembling fans—and among them is the laminaria, a valuable weed yielding iodine. Seaweeds also yield algin, an industrially important viscid substance, agar-agar, which is used in the confectionery industry, and several other products.

The Barents Sea, whose regime, particularly in the western part, is governed by the Gulfstream, mildens the rigorous climate of the European North. The huge quantity of warm water carried by this stream keeps a considerable part of the sea free of ice, moving the polar ice far to the north and raising the temperature not only of the sea itself but also of the coast. Plankton, which serves as food for tiny fish hunted by cod, herring, perch and plaice, abound in the Atlantic stream.

The Barents Sea is connected with the White Sea by a "funnel," which is a broad sound running between the Kola and Kanin peninsulas. South of this funnel, a comparatively long and narrow throat leads to the White Sea. The throat of the White Sea is an important seal-hunting ground.

The Kara Sea washes the extreme north-eastern territory of the European North. Ivan Krusenstern, the famous Russian seafarer, once called this stern sea a "bag filled with ice." In those days little was known about the ice of the Kara Sea and it was believed to be almost impassable. The building of Arctic ports and bases of the Northern Sea Route in Soviet years converted the Kara Sea into a

permanently functioning lane joining the European and Asian North of the Soviet Union.

The Soviet European North also includes several Arctic islands: Novaya Zemlya, Kolguyev, Vaigach and Franz Josef Land.

The sullen, majestic cliffs of Novaya Zemlya are almost totally devoid of vegetation. In summer countless flocks of sea-birds build their nests on the rocky shores and form seashore colonies of birds. The largest colonies are to be found on the southern shore of Bezymyannaya Inlet and are seven kilometres long. The chief game-birds are the guillemot, which are hunted for their eggs and meat, and the eider—for their down.

Franz Josef Land is an archipelago of numerous big and small islands, most of which consist of ice-covered basalt. This is a barren and desolate land of stone and ice. The ice constantly drifting between these islands and the mass of thousand-year-old glaciers make the short and severe summer even shorter than it ordinarily would have been.

Scientific investigations were started on a big scale in Soviet years, particularly after 1929 when a permanent settlement was established in the picturesque Tikhaya Bay on Hooker Island, where in 1913 the expedition led by the courageous explorer Georgy Sedov spent a winter.

The Arctic islands have acquired great scientific importance, when polar stations were set up there. The observations, particularly the meteorological observations, enable scientists to forecast the weather not only on the Northern Sea Route but on the entire territory of the Soviet Union.

Man armed with advanced science and unflinching will has come to stay in this desert world with its fantastic colours and dead stillness, where formerly the polar bear was the only master.

The Russian European North has always been considered a land of wealth. It was famous for its furs, timber, fish, sea mammals and walrus tusks. But in those days fur was regarded as the most valuable commodity.

The North began to be settled back in the 10th-12th centuries by people from Novgorod, which traded with the whole of Russia and Europe. The boyars, merchants and clergy of Novgorod began to fit

out bodies of oppressed bondsmen, sending them to the North. These groups slowly moved farther north, from river to river, dragging their *ushkuyi* (boats) across the marshes, and at last reached the "Frigid Sea," as the Russians called the Arctic Ocean in olden times.

As they moved northwards, the Novgorodites settled in places that were the most favourable for hunting. Such settlements or factories were established in the mouths of the Onega, the Vaga and the Northern Dvina and, subsequently, on the seaboard as well. These factories served as bases for further developing Pomorye as this territory was named. The monasteries, which seized land that could be ploughed and organized various industries, played a prominent role in opening up the North. But the peasants escaping from feudal oppression were the people who were mostly responsible for developing the North. They built their settlements on cleared land along the banks of rivers or on land owned by monasteries. Large-scale feudal land-ownership did not take shape in the North and the peasants were not touched by serfdom (they were regarded as belonging to the state). They were freedom-loving and resourceful. In addition to farming, they engaged in diverse other occupations including seafaring, fishing and hunting.

Towns that started out as hunting or fishing settlements played a big role in developing the North. Kholmogory and Veliky Ustyug became especially important as transport and mercantile junctures on the main trade routes from Pomorye to Moscow. The role of the northern towns increased when Russian trade with the West-European countries expanded through Pomorye.

Arkhangelsk (first called Novokholmogory) was founded in 1584 on the right bank of the Northern Dvina, 40 kilometres from the White Sea. Soon it became an important port of the Moscow State, and its growth can be seen from the fact that whereas it received 49 ships in 1694, the number of ships entering it in 1716 increased to 233.

Vologda's importance grew as Arkhangelsk expanded. It was the assembly point for export goods from Central Russia and for imports shipped to Moscow and Novgorod. In Vologda there was a barter market for furs from the Extreme North and from the North-East.

When St. Petersburg was founded in 1703 and began to grow as a port, Arkhangelsk lost its leadership in foreign trade because the

route to Western Europe was much longer through it than across the mouth of the Neva.

The decline of the North's role in Russia's trade was also furthered by the construction of the southern roads to Siberia as that deprived the North of its importance as a transit area between the Centre and the eastern regions. The extension of the state towards the shores of the Black Sea and the settlement and development of the southern regions also reduced the importance of the North.

During the period of capitalist development in Russia, the productive forces of the North grew slowly.

The timber industry was practically all that expanded there.

The volume of felling was quite big but it was carried on by rapacious methods. For example, selective felling was the principal method and insofar as almost all the timber was exported, chiefly in the form of logs, trees were felled primarily along the river banks and railways so that they could be speedily transported to Arkhangelsk and other ports. The colossal reserves of timber in the other territories of the North were not touched at all.

The sawmills were small and poorly mechanized.

The first thing that the Soviet Government did to raise the economy of the North was to reorganize the timber economy and the timber industry.

Total felling under which only the best trees were left untouched superseded selective felling. The stumps of the felled trees were uprooted by special machines and sent to timber chemistry enterprises where resin and turpentine were obtained from them. Total felling created the conditions for broad mechanization. The axe and handsaw were replaced by electric saws fed by mobile or stationary power stations with transmission lines to the felling sites. Up-to-date machinery is being introduced in all the processes of felling. It must be borne in mind that it is no easy thing to move machinery into a forest where the work-place changes constantly, where the worker is surrounded not by the fixed conditions of a workshop but the stern northern nature which is full of surprises.

Thousands of kilometres of mechanized timber-hauling roads—railways and tractor and motor roads—have penetrated into the taiga. Trailer tractors and winches are widely used as means of haul-

ing timber to the roads. Other machines tie logs into rafts or load them into barges.

Mechanization has done away with the seasonal character of timber felling as was inevitably the case in former days, when timber could be transported only at a certain season.

The people felling timber have also changed. Formerly, they were peasants who left their villages in search of seasonal work, but now they are skilled workers occupied on the job all year round and living in comfortable settlements at the timber stations.

In the mid-thirties, the timber industry of the North, which exported all its output and was almost exclusively a "currency fund," began primarily to meet the country's domestic requirements. This was dictated by the upsurge of the entire national economy which required tremendous quantities of timber and led to essential changes in the distribution of timber felling and timber-working enterprises. The centre of timber felling moved from regions close to the ports to areas adjoining railways along which timber was transported deep into the country. Formerly the sawmills were concentrated exclusively in ports, but the new timber centres, whose aim was to satisfy the domestic market, began to spring up deep in the timber region, in its south and east.

The total volume of timber felling and sawing has increased steeply. For example, 42 million compact cubic metres of timber or 14 per cent of the total for the Russian Federation came from the European North in 1955.

The timber-processing factories were supplied with the latest kinds of machines. Among these factories there are giants like the 24-frame mill in Arkhangelsk.

Raw timber has almost disappeared as an export item following the appearance of a large number of excellently equipped timber-processing enterprises. A large part of the output of sawmills consists of low-assortment sawn timber from raw material that formerly was not used and was regarded as waste.

Prior to the October Revolution there were only two small paper mills in the North, but now there are several huge paper and cellulose combines. A new industry—timber chemistry—has been set up with the building of factories producing resins and turpen-

tine, kraft pulp and plastics. The hydrolysis industry which produces alcohol from cellulose and paper waste is another new branch of the timber industry that has appeared in the North. In general, the utilization of waste—chips, sawdust and rods—is receiving a great deal of attention in the North.

The Soviet North is steadily making wider and more rational use of its inexhaustible wealth of timber.

Branches of economy such as the coal and oil industries, which are absolutely new for the North, have now appeared there.

For many centuries Russian people knew that there was coal and oil in this territory. We have the notes of a 15th-century chronicler stating that oil used for carts and for treating various maladies was extracted on the Ukhta. But systematic prospecting for these riches was begun only in Soviet years under the leadership of the well-known geologist Alexander Chernov. The investigations that went on from 1921 to the mid-thirties brought to light the Pechora Coal Basin between the Timan Mountains and the Urals. This basin has many grades of coal, ranging from brown to semi-anthracite and coking coals for the metallurgical industry. The prospected reserves already now exceed the reserves of the old Donbas and move the Pechora Basin into first place in the European part of the Soviet Union. Pechora coal can cover the needs not only of the European North, but also of the North and even Central Urals and the ports along the Northern Sea Route from Murmansk to Igarka. Development of the Pechora coal deposits has almost completely obviated the necessity of transporting coal over long distances from the Donbas to Leningrad and has solved the problem of providing adequate supplies of coking coals for the metallurgical industry of the North-West.

The most important deposits in the Pechora Basin are in Vorkuta, where coal can be obtained both by pit and open-cast mining. The caloricity of the Vorkuta coal is as high as that of coal from the Donbas and it cokes excellently.

However, transportation facilities had to be set up before the Pechora Coal Basin could become the "Northern stokehold" and a source of coal for the vast territory around it. That task has been carried out through the construction of the North-Pechora Railway.

Deposits of oil have been discovered in the upper reaches of the Pechora and along the Izhma and the Ukhta rivers.

But in the North the oil industry does not yet play as big a role as coal-mining. Account must be taken of the fact that the search for oil is continuing and that increasing prospects of developing the oil industry in this region are coming to light.

It is an interesting fact that the oil from the Yarega River is as thick as tar and is extracted not by means of wells but by pits as though it were coal or ore. Development of the Yarega heavy-oil deposits holds out the greatest promise in the Ukhta oil-fields. At the same time, development will proceed in the light-oil deposits of the Upper Izhma and Middle Pechora. This oil is refined locally.

The Ukhta area also yields gas. On Mount Krutaya there is an up-to-date plant turning gas into industrial soot, which is an indispensable raw material for the rubber and the lacquer-paints industries. Big gas deposits were discovered in 1956 at a place called Jebolskoye in the basin of the Upper Pechora. It was found that this gas has a large paraffin content. The Ukhta district also has great reserves of asphaltites which have given rise to a lacquer and bitumen industry.

There are big peat fields in the marshes of the North. In terms of air-dry mass, these reserves exceed 20,000 million tons.

The thick layer of sedimentary rocks in the basins of the Northern Dvina, the Onega and the Mezen contains large quantities of dolomites, sands, clays, gypsum and salts.

The extensive mineral wealth of the North is awaiting further development. Prospectors have revealed tremendous deposits of combustible shale, iron ore and several other minerals. That is only the beginning, for much still remains to be prospected, especially the huge region between the Timan and the Urals. The Bolshezemelskaya Tundra is a vast reserve for the oil and gas industry. Although geologists have not yet started work there it is known to contain bitumen.

The North recently began producing its own primary metal. An iron and steel works in Cherepovets operating on iron ore from the Kola Peninsula and on Pechora coal was commissioned in 1955.

This is opening up the possibility of further developing the engineering industry in the North.

At the moment the metal-working industry of the North is dominated by ship-building and ship-repair enterprises situated in sea and river ports. Several machine-building factories are meeting the requirements of the forest economy, manufacturing timber carriers and gas-generator motors, and repairing equipment for timber mills. A large locomotive and carriage repair works has been built in Vologda.

Farming has been successful in the North in Soviet years, the crop area increasing by 50 per cent since the Revolution. Crops that have never been grown there before, wheat for example, are now cultivated. The farms are using large numbers of tractors and other agricultural machines. This is ensuring proper cultivation of the soil and higher yields. Intensive truck-gardening has been started near the towns and the newly-built industrial centres. Flax is cultivated in the southern part of this region.

It is not land cultivation but animal-breeding that is the chief branch of farming in the North. Especially rapid progress has been made by dairy farming, not only in Vologda (which is the southernmost area) but also in Arkhangelsk regions. The northern Kholmogory dairy cattle are famous throughout the country. In the North, animal productivity is above the average for the whole country. The milk is richer and for that reason the North produces large quantities of butter.

Reindeer-breeding predominates in the tundra and forest-tundra of the Extreme North. It is difficult to overestimate the deer's importance in the life of the local inhabitants, particularly the Nentsi. The uses of this animal are truly universal. Its meat is the staple food of the population. Garments, foot-wear and dwellings are made from its skin. Lastly, this hardy animal is absolutely irreplaceable as a means of transport in the desert spaces of the tundra.

Hunting is of no small importance in some regions, particularly in the Extreme North. The chief objects are fur-bearing animals (the polar fox in the tundra) and game-birds.

The ancient occupation of fishing and hunting sea-animals likewise play a noticeable role. Arkhangelsk has a flotilla of trawlers that

fish in the White Sea and along the Murmansk shore. Animal-hunting is mainly in the hands of the Mezen collective farms which concentrate principally on seals. Part of the catch is processed at a special factory near Arkhangelsk.

A number of food, textile and other enterprises working on local agricultural raw materials have been built in the North.

There is a factory producing chamois from deer skins in Ust-Tsilma, the deer-breeding zone. A new flax mill producing tens of millions of metres of linen has been opened in Vologda, the centre of the flax-growing region. Condensed milk, butter and cheese factories have also been built in this region.

Although Soviet years have witnessed the building of new economically important railways, and the second line to augment the old Vologda-Arkhangelsk Railway, the re-equipment of the seaports, the organization of regular navigation on the Pechora and an enlargement of the merchant marine, the transport problem continues to restrict the further expansion of the national economy in the North.

Development of the yet untouched forests and the building of accompanying sawmills and timber-chemistry enterprises, the far-reaching tasks facing the ferrous metals industry which are being carried out on the basis of the Pechora coking coals and Urals ores, and the rapid advance of all the leading branches of industry require further transport construction in the European North with priority for latitudinal railways.

The necessity has already arisen of linking the Pechora Railway with the Urals in order to give the Pechora coal an outlet to the Urals metallurgical factories. The building of the Pechora-Urals line will help to accelerate the development of the North's coal and other riches and will be a big contribution towards solving the fuel problem of the European part of Russia.

Data for 1959 show that there are 3,400,000 inhabitants in the European North with a mean density of 2.9 persons per square kilometre. This is ten times below the mean density of the population throughout the whole of the European part of the Soviet Union. With more than 5 per cent of the country's territory the North only has 1.6 per cent of the population. At the same time, the population is very unevenly distributed: the density fluctuates from

0.6 persons per square kilometre in the Pechora Basin to 11.5 persons in the Cherepovets-Vologda area. Elsewhere, there are settlements only in a narrow strip along the rivers, chiefly along the Northern Dvina, in whose basin 80 per cent of the population is concentrated.

The share of the urban population is growing constantly as a result of industrial development. For example, in 1940 there were 25 towns and 15 settlements and in 1957 there were 32 towns and 57 town-type settlements. Most of them are centres of the mining or timber-felling industry. Vorkuta, the "coal town," is among the new projects completed in Soviet years. It is hard to believe that in 1931 there was not even a single mud house where the chimneys of a power station now tower into the sky, where mines daily dispatch coal to the south, where there are long thoroughfares flanked by modern houses, and where there are cinemas and theatres.

Culture has made great strides in the North. This is particularly noticeable among the formerly backward non-Russian peoples. Everywhere one finds schools, hospitals and clubs.

Arkhangelsk and Vologda regions and the Komi Autonomous Republic are part of the European North.

Arkhangelsk Region includes the Nenets National Region. The region of the Arctic islands is also administratively subordinated to it.

Territorially, this region very nearly coincides with the basins of the Northern Dvina, the Onega and the Pechora and is the chief timber and fish producer of the North. Along the upper reaches and in the mouth of the Northern Dvina, the huge forest economy is served by two centres: Kotlas and Arkhangelsk, the biggest town of the North with a population of 256,000 people.

The city of Arkhangelsk stretches for some 30 kilometres in a narrow strip along the right bank of the Northern Dvina.

The river breaks up into a multitude of channels in the delta and the city lies where the delta begins, at a huge natural roadstead. This roadstead is the heart of Arkhangelsk. The broad, deep Dvina is seen here in all its majesty.

This great sparkling river is an unforgettable sight on summer evenings when the sun hangs over the horizon and the water plays

in a dazzling cascade of colours in its beams. The river is always full of schooners, yachts, heavy and fast launches, motor boats, fishing trawlers, barges loaded with timber, and tugboats hauling long chains of timber rafts that sometimes span the river like a roadway.

On the banks and islands timber is stacked everywhere. These stacks form streets and lanes—a whole city of logs and sawn timber of various sizes. Known as timber markets, there is one at every sawmill and together they stretch for a few score kilometres along the Northern Dvina and its chief tributary, the Maimaksa. Huge freighters flying the flags of many nations lie moored opposite to these markets. Nearly a thousand sea-going vessels call at Arkhangelsk for timber in the course of a single navigation season.

Such is the feature of this port and city of sawmills.

Arkhangelsk is at once a first-class timber-exporting port of world importance and one of the biggest timber centres in the country. Nearly ten million cubic metres of timber pass through it every year. At the same time, it is a centre of ship-building and a base for Arctic expeditions. It is an important link of the Northern Sea Route, being its chief junction. Very rarely do books devoted to the Arctic fail to mention this city.

Its location in a marsh continues as in the course of nearly four centuries to make building a difficult process. Before a house could be built, piles had to be driven into the ground and a foundation laid on these piles. Many of the houses in Arkhangelsk were built in this manner and it is only beneath the biggest of them that there are deep foundations reaching down through the layer of peat, which is sometimes six metres thick and rests on moraine.

Despite this feature of the "building geology," the streets are no different from those of any other city. True, the trams in the main street, which is named after Pavlin Vinogradov, a hero of the Civil War, move at the slowish "Arkhangelsk" pace.

The unusual thing about Arkhangelsk is that being bounded by a river on one side and by a marsh on the other it developed lengthwise, only along the bank. It takes some time to go from one end of the city to the other, but all that is needed to reach the marsh

is to turn the corner of the central street and go a short way across the city. Along the city's breadth there are only five streets where only recently there were three. The splendid Esplanade and Petrogradsky Prospekt run parallel on either side of Vinogradov Street. Everything beyond, although two more streets have been laid in Soviet years, is called "The Mosses" by old-timers.

Today, large sums of money are being spent to drain the land around Arkhangelsk. The marshes are cut by canals which carry away the subsoil waters. The marsh is then rammed and the soil settles. This lets Arkhangelsk expand in breadth and ensures normal conditions for construction work.

Arkhangelsk is a major cultural centre. It has three institutions of higher learning. One of them, the timber technical institute, trains timber experts for the entire country. In addition, the city has several research establishments, including a branch of the U.S.S.R. Academy of Science.

The south-west and south of the European North make up Vologda Region. It has a manifold economy but is essentially a region of dairy-farming and flax-growing and the chief grain base of the North.

At the same time there are large industrial centres in this region. We already know that Cherepovets, formerly a small town, has developed into a big centre of the ferrous metals industry. Other well-known towns in this region are: Sokol, which specializes in the production of paper; Chagoda, the seat of the Northern glass industry; Totma, which has big sawmills; Veliky Ustyug, whose factories produce plywood and bristles; and Krasavino, which has a big linen mill. In Vologda Region, flax-fibre is processed at nearly 20 mills. The abundance of flax gave rise to lace-making, which is a traditional craft of the Vologda peasants.

The town of Vologda has 138,000 inhabitants. One of the oldest towns in Russia, it is considered to be of the same age as Moscow. Quite a few architectural monuments have survived in it. Today, this is a big industrial centre with enterprises of the wood-working, sawing and butter-and-dairy industries.

In the basins of the Vychegda and the Pechora rivers, a big territory is occupied by the Komi Autonomous Socialist Republic. The

part jutting into the Arctic Circle is tundraland, while the southern part is covered with forests and is a continuation of the forest economy of the North. The population lives chiefly in the south, where in addition to timber-felling they are engaged in farming. The North-Pechora Railway, which passes close to Syktyvkar, capital of the Komi A.S.S.R., is of great importance for the economy of this region. There is a pedagogical institute and a branch of the U.S.S.R. Academy of Science in Syktyvkar. Formerly a people without political rights, the Komi received in Soviet years every opportunity of developing their economy and culture. Great mineral wealth lies in the northern part of the Komi A.S.S.R. This includes the Pechora Coal Basin, with centres like the town of Vorkuta, and the Ukhta oil-fields. For that reason, the Komi Republic may be called the fuel and power base of the North.

The Nenets National Region occupies the eastern, tundra part of Arkhangelsk Region. All of it is within the Arctic Circle, along the shores of the White, Barents and Kara seas, as a result of which the climate is rigorous and the population sparse. The main occupation of the Nentsi, who make up the indigenous population, is reindeer-breeding, which has now been reorganized along socialist lines. Fishing and hunting are also important occupations, and fish-canning factories have been built. In Soviet years, a large part of the former nomad population have settled down and only herders move with the herds of reindeer. Trading bases keep the Nentsi supplied with hunting equipment, consumer goods and food at government prices. Fur is procured on a similar basis. Medical and veterinary services have been organized. Naryan-Mar (which means Red Town), the centre of the region, is a river-mouth port and a processing point for timber rafted down the Pechora. The Arctic seaport of Amderma, which is used by ships plying the Northern Sea Route, is in the Yugorsky Shar Straits. Deposits of fluorite have been discovered there and a new industrial region has been created as a result.

North of Vorkuta, in the area of Khalmer-Yu, geologists have discovered a big coal basin, a continuation of the Pechora Basin, stretching deep into the Bolshezemelskaya Tundra right up to the Pai-Khoi Mountains.

Leningrad, one of the biggest cities in the world, which has been called the Northern Palmyra because of its beauty, has been in existence for over 250 years. Two and a half centuries cannot be called a long span of time for the tremendous creative work that has been done there.

Owing its rise to the brilliant foresight of Peter the Great, who did not stop at founding the capital of his growing empire on the swampy and forest-clad shore of the Gulf of Finland in the mouth of the Neva River, St. Petersburg was already a city with nearly 100,000 inhabitants by the mid-18th century.

The foundation stone for a fortress was laid on May 27, 1703 and, as Peter's *Journal* states, it was "called St. Petersburg." This is accepted as the date when the city was founded. Later the fortress itself was called Petropavlovskaya (Peter and Paul) after the cathedral that was soon built on its territory "in honour of the apostles Peter and Paul."

In 1704, the Petropavlovskaya Fortress received its first wharf and, later, the Galley Harbour for rowing vessels was built on the western side of Vasilyevsky Ostrov, and Petersburg became the country's chief centre of foreign trade. The naval fortress of Kronschlot (renamed into Kronstadt in 1723) was built in 1703 on Kotlin Island. It commanded the mouth of the Neva and ensured the security of the whole of the Finnish coast. As a consequence, the Petropavlovskaya Fortress lost its military importance and was converted into a political prison.

In 1712, St. Petersburg became the capital of Russia.

Today it is hard to imagine that the famous streets of this great city were nothing but paths cut into a forest.

There is no need to speak of the incredible hardships the builders had to overcome when with the meagre technical means of the day they found a forest-covered swampy site before them.

Large-scale reclamation had to be started and countless piles driven into the ground. The builders of the Petropavlovskaya Fortress had to dig the ground with their hands for lack of instruments and

carry the earth in sacks and bast matting. All this was done by serf peasants driven to the banks of the Neva from all parts of Russia.

St. Petersburg itself was built purposefully, in accordance with a plan and a strict, well thought-out system. The reason for this was that it was the capital and at first all the buildings were erected by the government.

A special Building Office was set up soon after the city was founded and it centralized all the construction work. It established strict regulations and prescribed that all the streets should be developed along a continuous line with the result that finished thoroughfares were laid. People wishing to build houses had to get their plans from the Building Office. These plans were worked out according to classes: houses for the nobility, houses for wealthy people, and dwellings for the common people. The districts were planned on the same principle: the centre was for the palaces of members of the imperial family and the aristocracy, and for government and public buildings; the outskirts were for the poor, working people. The centre for the ruling classes and the outskirts for the common people was the principle of settlement and building that was preserved in St. Petersburg right up to the Great October Socialist Revolution. On one side were imposing architectural ensembles, magnificent palaces and cathedrals, granite esplanades, gardens and parks; on the other were the "Petersburg slums," and the lodging houses for the poor with their enclosed courtyards with which we are familiar through the works of Nikolai Gogol, Fyodor Dostoyevsky and Nikolai Nekrasov.

St. Petersburg and its environs expanded rapidly in the 18th and early 19th centuries, up to the fall of serfdom in 1861. The latter half of the 19th century and the pre-revolutionary years of the 20th century were the epoch in which capitalism developed swiftly in Russia. This was a period when architecture declined and hardly any important buildings were erected.

Several outstanding buildings were erected in St. Petersburg during the reign of Peter the Great. Among them are the remarkable creations of Domenico Trezzini, who built the Cathedral of St. Peter and St. Paul with its graceful gilded spire that is one of the notable landmarks of Leningrad. This building is an example of Pe-

ter's zeal in promoting construction in St. Petersburg: he demanded that the belfry of the Cathedral of St. Peter and St. Paul with its spire should be taller than the Ivan the Great Belfry in Moscow. Trezzini designed the Peter Gates in the Petropavlovskaya Fortress and the palace of Peter the Great in the Summer Garden.

Other remarkable buildings of that epoch that have survived in the Vasilyevsky Ostrov are the Twelve Colleges (now the Zhdanov State University), which was also built by Trezzini, and the Cabinet of Curiosities (architect—Matarnovi). At present the Cabinet of Curiosities houses the Lomonosov Museum and the Museum of Anthropology and Ethnography of the Academy of Science.

As distinct from the early 18th century, when at Peter's insistence the main attention was devoted to public buildings and stern simplicity predominated in architecture, the years following the 1730's witnessed the introduction of a sumptuous decorative baroque and a striving to build showy, glittering palaces.

The most outstanding exponent of this style was the famous architect Carlo Bartolomeo Rastrelli, whose name is associated with many renowned buildings. Rastrelli's masterpiece was the beautiful Winter Palace on the Neva (at present the State Hermitage, which is one of the leading museums in the world). It has 1,050 rooms, 117 staircases, 1,786 doors and 1,945 windows. Rastrelli also built the splendid ensemble of the Smolny Monastery, and the palaces of the courtiers Vorontsov and Stroganov.

In the second half of the 18th century, the baroque style in architecture gradually gave way to strict Russian classicism. An expression of this was the striving to impart grace, austerity and simplicity to the city. Broad, straight thoroughfares were built. The canals and the river were linked into a single system. Yury Veldten and Yegorov erected the beautiful grating round the Summer Garden. Echoes of the baroque style were still felt in some of the buildings (the Maly Hermitage, the Academy of Arts), but mainly strictly classical buildings with impressive, harmonious forms were erected in the last quarter of the 18th century. These include the Smolny Institute, a white building with columns on ribbed arcades designed by Giacomo Quarenghi. St. Petersburg also owes to Quarenghi the outstandingly beautiful Academy of Science and the Hermitage

Theatre. Ivan Starov built the Trinity Cathedral in the Alexander Nevsky Monastery and the Tavrichesky Palace, the property of Prince Grigory Potemkin, outstanding statesman and military leader during the reign of Catherine II. Vasily Bazhenov designed the Mikhailovsky Castle, the gloomy residence of Paul I where he was murdered by court plotters.

In the history of the architecture of St. Petersburg, the first half of the 19th century was marked by the activity of a whole galaxy of brilliant architects—Andrian Zakharov, Andrei Voronikhin, Thomas de Thomon, Carlo Rossi, Vasily Stasov, Andrei Mikhailov, and August Montferrand. The Kazan Cathedral (built by Voronikhin) with its colonnade facing the Neva Prospekt is one of the city's adornments. Another outstanding building by Voronikhin is the Mining Institute. The Admiralty was rebuilt by Zakharov, while the buildings of Rossi completed the architectural appearance of the central part of St. Petersburg. Rossi designed the General Headquarters with its triumphal arch in Palace Square, and the Senate and Synod in the adjoining Admiralty and Senate (now Decembrists) squares. The huge St. Isaac's Cathedral, built by Montferrand, is one of the most remarkable buildings in the city. Standing on swampy land, it took 40 years to build. From its belfry one gets a broad panorama of the Northern Palmyra with its great squares, streets, bridges, canals and the handsome Neva River.

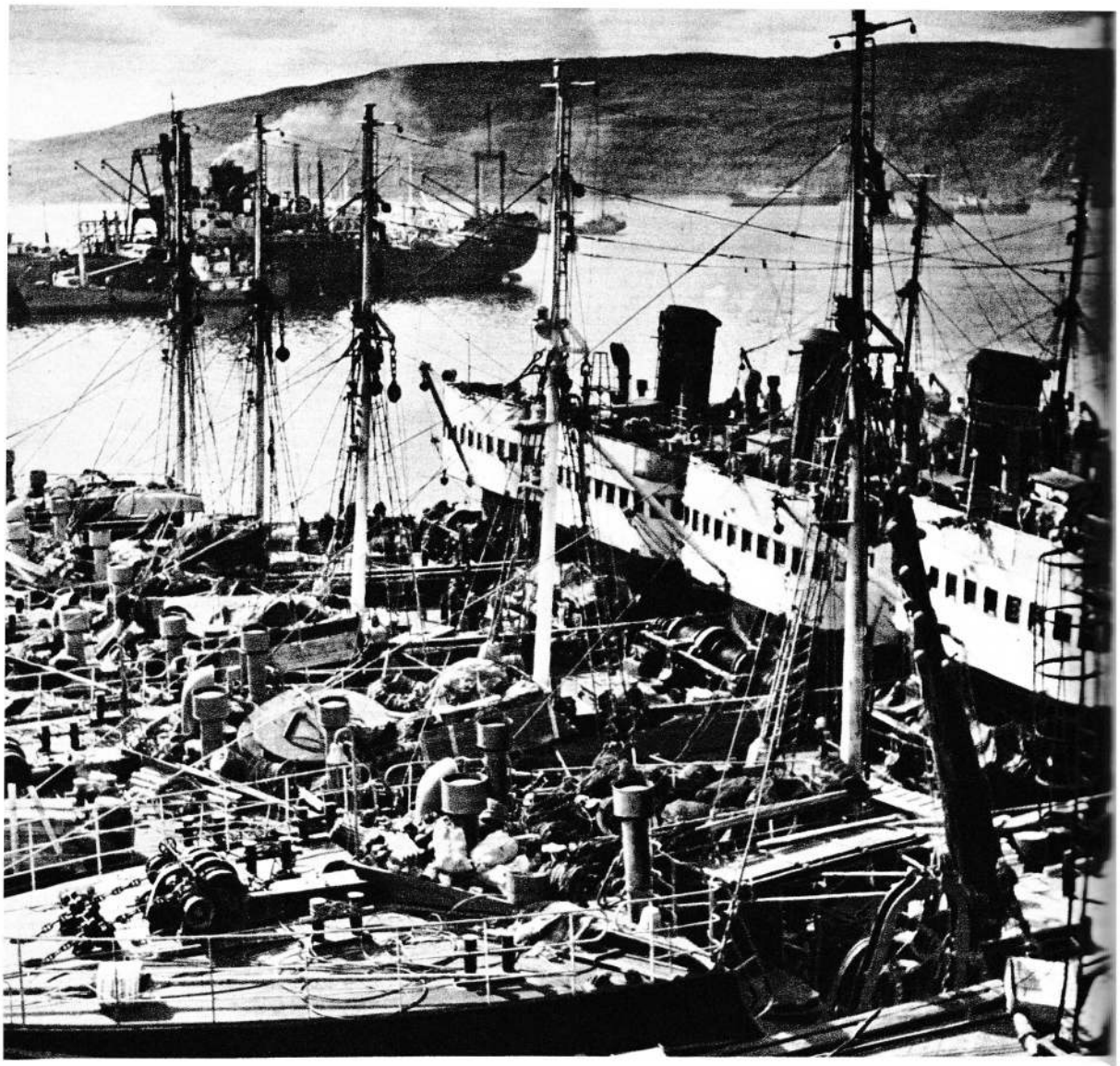
The result of this intensive development was that within a century and a half St. Petersburg became one of the world's loveliest cities.

The city's beauty is enhanced particularly by the granite embankments along the Neva, the more than 600 bridges, the magnificent squares and monuments, the most outstanding of which is the Bronze Horseman, a monument to Peter I sculptured by Etienne Maurice Falconet.

The city continued to grow in the period of capitalist development. But the building went on by fits and starts. The former ensemble principle was buried in oblivion and not a single architectural complex was built in St. Petersburg beginning with the mid-19th century. An affected modern style, which was a complete departure from the classical traditions, began to seep into architecture. For example, this was the spirit in which were built the Singer

Palace Square, Leningrad

Kirov Works, Leningrad



Fishing fleet quay at the port of Murmansk

Co. House (now the Book Palace) in Nevsky Prospekt and the Yeliseyev House, which is now occupied by the Central Grocery and Provision Shop and the Comedy Theatre.

In this period, development was confined mainly to the erection of tenement houses with the purpose of squeezing out the maximum profits without providing the lodgers with the most elementary conveniences. Housing conditions were especially deplorable in the workingmen's slums on the outskirts. Beyond the Narva, Vyborg, Neva and Moscow turnpikes the people lived in cellars, dirty and damp slums where at best a big family occupied a dingy room. According to official data, there were 150,000 people renting corners or beds in St. Petersburg in 1912.

After the October Revolution, development was directed chiefly at eliminating the housing crisis and, at the same time, at solving the "centre-outskirts" problem. Huge blocks of apartment houses were built first and foremost in the outskirts, while the city itself grew in breadth as well. New apartment houses appeared in the Vyborg Storona, the Krestovsky Ostrov and at the Elektrosila Works. Houses with a living space of eight million square metres were built in Leningrad in the post-war period alone, while by 1960 the city will have an additional 5,500,000 square metres of living space.

Public buildings were erected at the same time and these include numerous Palaces of Culture and theatres. New squares and two big parks were laid out. Many monuments were set up in the streets and squares. The first section of the Leningrad Metro was commissioned in 1955.

Large-scale housing development, which envisages Leningrad's extension southwards with the inclusion within the city's perimeter of suburbs such as Pulkovo and Gatchina, will completely do away with the bitter heritage of the past—the extraordinary congestion in some of the old districts.

Prior to the Revolution, the city developed not only as the country's political and cultural centre but also as a major seat of industry. By the 18th century there were food and textile enterprises, factories producing building materials, and ship-building yards; the Izhora Metal Works was in the process of construction. The state

pig-iron works, which subsequently became the famous Putilov (now the Kirov) Works, was moved to St. Petersburg from Kronstadt in 1801. The Neva ship-building yard and other metal-working enterprises were opened in the mid-19th century.

At the same time, the centre of maritime trade shifted to St. Petersburg from Arkhangelsk. In 1726, St. Petersburg took care of 90 per cent of Russia's foreign trade.

The construction of Russia's first canal between the Msta and the Tvertsa rivers, as part of the Vyshny Volochok Water System, was started immediately after the founding of St. Petersburg. This system, which was opened in 1709, joined the Baltic basin to the basin of the Volga as a result of which St. Petersburg began to receive grain and livestock from the Volga Area, oil from Baku, metal from the Urals and products from other parts of Russia. Right up to the beginning of the 19th century, when the Mariinskaya and Tikhvinka systems were built, the Vyshny Volochok System was the only waterway between the Neva and the Volga. Like the Vyshny Volochok System, the Mariinskaya Waterway was a link between the Baltic and the Caspian, but it was shorter and more convenient. The purpose of the Tikhvinka System was to provide a passage for small vessels carrying valuable goods and imports from Petersburg to the Nizhny Novgorod Fair.

St. Petersburg's economic position was strengthened with the building of railways, particularly the Nikolayevskaya (now the Oktyabrskaya) Railway, which, opened in 1851, linked the city up with Moscow.

The population increased rapidly. In the mid-19th century there were about half a million inhabitants but towards the beginning of the 20th century this number rose to more than two million.

Present-day Leningrad is a major industrial centre, a city of factories and ship-building yards, a city of technical progress and a port. Its population increased to 3,300,000 people in 1959.

It is one of the biggest centres of skilled machine-building in the Soviet Union. Its enterprises include the nationally famous Kirov Works, the Metal Plant, the Baltic Works, the Nevsky Engineering Factory and the Elektrosila Works. Turbine-building is a highly developed branch of the city's industry. Leningrad produces hydro-

turbines and steam turbines. The machine-tool and instrument-making industries are also highly developed.

The city's numerous electrical engineering enterprises put out turbogenerators, transformers and electrical measuring instruments.

Ship-building occupies an important place in Leningrad's industry. The largest enterprise in this field is the Baltic Ship-Building Works.

As we have already said, Leningrad is a city of technical progress. In the course of 1956 alone, its factories mastered the production of more than 200 new types of modern machines, machine-tools and instruments. The Metal Plant and the Elektrosila Works began the production of 200,000-kilowatt-capacity steam turbines. The Nevsky Engineering Factory is making new types of powerful air compressors which raise the productivity of blast-furnaces by 15 per cent. The Elektropult Works has started the production of instruments that operate power stations from a master panel located a thousand kilometres away. The Sverdlov, Ilyich, Stankolit, Elektrik and other factories are making many types of modern boring, grinding, plano-milling and turret lathes.

The many other big factories in Leningrad include the Krasny Treugolnik Rubber Works, which has been completely reconstructed, the Nevsky Chemical Combine which produces mineral fertilizers, the Krasnaya Nit and other textile mills, the Skorokhod Foot-Wear Factory, a leather factory, a meat-packing plant, the Krasny Konditer Confectionery, and a tobacco factory.

The Leningrad factories are going over to comprehensive mechanization and automation. The result of the installation of new machinery and the growth of the skill of the workers was that in Leningrad labour productivity was 11 times higher in 1956 than in 1913.

Scientists have rendered Leningrad's industrial enterprises a large measure of assistance. In close co-operation with production innovators, quite a few of the research institutes in the city are working on the tasks facing industry. Many new methods enriching science and rationalizing industry have been worked out in this way.

As a seaport Leningrad has a long history. Cargoes are sent from here to the Extreme North and the Soviet Far East via the Northern

Sea Route. The port plays an especially big role in foreign trade. The number of foreign ships putting in at Leningrad is increasing every year, while exports, particularly timber, are growing steadily.

Leningrad is also an important river port with timber and mineral building materials playing the chief role in the freight turnover.

Leningrad vies with Moscow for the size of its railway freight turnover. More than a third of all incoming freight consists of fuel (coal, oil, firewood and peat), and somewhat less than a third of building materials, timber and ferrous metals. A feature of this turnover is that on the average incoming freight is four times greater than what goes out. The railway transport is serviced by five stations: Baltic, Warsaw, Vitebsk, Moscow and Finland.

With its numerous educational establishments, scientific institutions, museums, libraries and theatres, Leningrad is second to Moscow as a cultural centre.

It has 41 institutions of higher learning (in 1913 there were 23) with a body of more than 150,000 students, including nearly 50,000 students taking extra-mural courses which they combine with work. Leningrad University, the oldest and biggest educational institution in the city, has trained 35,000 specialists since the establishment of Soviet power. There are 14,000 students in its 12 departments. A total of 80,000 people are studying in the city's 90 special secondary educational establishments (technical schools and vocational schools).

At the beginning of 1957, there were 187 research establishments with 14,700 scientific workers in Leningrad.

Many of the city's research organizations enjoy world fame and these include the Institute of the Physiology and Pathology of the Higher Nervous System founded by Academician Ivan Pavlov, the Marr Institute of Language and Thought, the Pulkovo Central Astronomical Observatory, and the Physical and Technical Institute headed by Academician Abram Joffe. The research establishments that have appeared in recent years include institutes of high-molecular compounds, chemistry, silicates, semi-conductors, evolutionary physiology, electrical mechanics and cytology.

Of Leningrad's cultural establishments, special mention must be made of the Saltykov-Shchedrin Public Library, which ranks in im-

portance with the Lenin State Library in Moscow, the Library of Congress in Washington, the British Museum Reading-Room in London and the National Library in Paris. It was founded in 1814 and had altogether 250,000 books of which only some 2,000 were in Russian. The year it was opened it had 369 readers who took out 1,341 books. Today this library has nearly 12 million manuscripts and books. In 1956, it was visited by 106,000 readers who took out more than six and a half million books and manuscripts.

Another famous book repository in Leningrad is the library of the Academy of Science of the U.S.S.R. with its nine million books.

Altogether there are nearly 1,800 libraries in the city.

The archives in the city are of great scientific value and this primarily concerns the Central Historical Archives, the Archives of the Academy of Science and the Maritime Archives.

Leningrad is frequently called a city of museums. Its 50 museums contain many of the world's greatest treasures of art and inestimably valuable relics of material and spiritual culture.

The Hermitage, a depository of world art, is the pride of Leningrad and one of the sights no visitor fails to see. Its 322 halls contain over two million exhibits, including the brilliant works of Leonardo da Vinci, Michelangelo, Raphael and Titian. The Hermitage has the world's richest collection of paintings by Rembrandt and many paintings by Rubens. In addition to Western art, the culture of the peoples of the East is represented by a large number of first-class monuments.

The works of Russian national art are in the Russian Museum, which has the country's biggest collection of Russian sculptures and an enormous number of Russian paintings dating from the 10th century to our day. The Museum has a department devoted to folk and applied art.

The biggest of the many historical-revolutionary museums in Leningrad is the Petropavlovskaya Fortress that was a political prison for two centuries. Numerous courageous fighters against the autocracy had been incarcerated in it.

The Marble Palace now houses a branch of the Lenin Museum. The houses where Lenin lived have been turned into memorial mu-

seums and the exposition in them traces separate periods of Lenin's life.

Also interesting are the military museums (Naval, Artillery) and the museums of the Academy of Science: Anthropology and Ethnography, Geological, Botanical, and Zoological, all of which contain unique exhibits.

A special place is occupied by the Literary Museum of the Academy of Science's Institute of Russian Literature. Known as the Pushkin House, this museum contains the country's largest collection of documents and materials about the life and work of Russian writers. The city has memorial museums dedicated to Mikhail Lomonosov, Alexander Suvorov, Alexander Pushkin, Nikolai Nekrasov, Dmitry Mendeleyev and Ivan Pavlov.

Leningrad is famous for its theatres. Deserved popularity is enjoyed by the Kirov (formerly Mariinsky) Opera and Ballet Theatre, the Pushkin (formerly Alexandrinsky) Dramatic Theatre, the Gorky Bolshoi Dramatic Theatre, which was set up after the Revolution, and the State Philharmonic Society.

The suburbs are closely linked with Leningrad's past and present.

Within a radius of 50 or 60 kilometres, there is heavy passenger traffic between the suburban zone and the city itself. A group of suburbs is outstanding for their beauty and historical monuments. These are Petrodvorets, Gatchina, Pushkin, Pavlovsk, Lomonosov and other former royal residences, which with their sumptuous palaces and magnificent parks are a kind of Russian Versailles. The fountains of Petrodvorets (formerly Peterhof) are celebrated in the poems of Alexander Pushkin. The name of this great poet has been given to the former Tsarskoye Selo, where he studied in the Lyceum. All these places constantly attract large numbers of tourists and excursionists.

The most popular summer-cottage settlements and recreation spots around Leningrad are on the Karelian Isthmus. Outstanding among them is the first-class spa of Sestroretsk with its sandy beaches, Komarovo and Zelenogorsk. Ilya Repin's name has been given to a beautiful place where this great painter lived and created his remarkable canvases. Sandy beaches and pine woods stretch from Sestroretsk to Vyborg Bay.

Kronstadt is one of the interesting satellite-towns around Leningrad. This naval fortress on Kotlin Island guards the sea approaches to Leningrad and is connected with the city by a sea canal through the Gulf of Finland. Huge ocean-going vessels reach the port of Leningrad by means of this canal.

Where the Neva River leaves Lake Ladoga stands Petrokrepost, formerly called Schlüsselburg. A fortress was built here by people from Novgorod long before Petersburg was founded. Schlüsselburg lost its importance as a fortress during the reign of Catherine I and, like the Petropavlovskaya Fortress, was converted into a political prison. It became a museum after the October Revolution. Today, the town of Petrokrepost is a base of the fishing fleet operating in Lake Ladoga.

The oldest Russian machine-building works, the Izhora Factory which was built in the days of Peter I and was at first a copper and wire factory, is located in Kolpino, a big industrial centre. In Soviet years, this factory began to produce a great variety of machines. In particular, it made the first blooming mill in the U.S.S.R.

From the industrial point of view, Leningrad's suburbs are the most highly developed part of Leningrad Region and the entire economic area, which includes Pskov and Novgorod regions. This area has big fuel and power, metal and chemical, building materials, timber, wood-working and textile industries. Intensive farming ensures Leningrad and many other cities with milk, potatoes and fresh vegetables.

The biggest industrial centres in the Leningrad Economic Region are Vyborg, Pskov and Novgorod.

Vyborg is situated on the Karelian Isthmus, on the shore of the Gulf of Finland which cuts deep into the mainland. Occupying a number of islands and peninsulas, this city is laid out with streets meeting each other at right angles and is noted for its beautiful environs. An old Russian town, Vyborg was a fortress in ancient times. The Saima Canal leading to the port of Vyborg was built in the last century. Modern Vyborg is, after Leningrad, the most important seaport of the region. It also has developed wood-working and timber industries.

Novgorod, one of the oldest Russian towns which played no mean

role in the settlement of the north and north-east of the European part of Russia by Russians, stands on the Volkhov River, close to where it leaves Lake Ilmen. In the town there is a kremlin and other ancient monuments. Present-day Novgorod is a regional centre and is known for its porcelain and glazed earthen-ware, ship-repair, wood-working and metal-working industries.

Pskov, another of the ancient Russian towns which is now a big railway junction and a regional centre, is situated to the south-west of Novgorod. The surrounding districts supply Pskov with flax, which is processed at the linen mill and other textile enterprises in the town. Pskov also produces flax-processing machines.

Leningrad and its suburbs is the nucleus of the North-West, which is one of the leading economic regions of the Russian Federation. After the Centre, this is the most highly developed industrial region in the Soviet Union. The North-West produces a considerable portion of the Russian Federation's hydraulic turbines, more than 40 per cent of its cellulose, nearly 40 per cent of its fish, 9 per cent of its mineral fertilizers, more than half of its rubber and over 18 per cent of its leather foot-wear.

The geographical position of the North-West, which has outlets to the Baltic and White seas, is of exceptional importance as a means of communication between the whole of the Soviet Union and Western Europe.

In addition to Leningrad, Pskov and Novgorod regions, the North-West consists of Murmansk and Kaliningrad regions and the Karelian Autonomous Republic.

Karelia extends from Lake Ladoga to the White Sea. This northern country has a landscape all its own, the features being dense forests, smooth mirror-like lakes, fast rivers, stony ridges, and swamps.

In the days of tsardom, Karelia was a place of exile and no wonder it was called "Near Siberia."

In his *Land of Unfrightened Birds*, Mikhail Prishvin gives the following description of the Karelian landscape as seen from an elevation in its centre:

"From here, if we could see that far, we would find a great stone terrace with steps leading backwards towards the Baltic and for-

ward to the White Sea. Magnificent lakes, which are steps of this giant double staircase, alternate with roaring rivers and waterfalls. . . . At the foot of the first slope of the terrace is St. Petersburg, and of the second—the Arctic Ocean with its desert of ice."

Nearly two-thirds of Karelia are under forests. Pine, which is widespread chiefly in the northern areas, is the most important as industrial timber. Central Karelia has, in addition to pine, great forests of fir which are a source of raw material for the cellulose and paper industry. In the south, the coniferous and deciduous forests merge. The beautiful Karelian birch is used for expensive furniture and other items.

Rivers and lakes take up nearly a quarter of Karelia. No exact figure can be given for the number of lakes, but in any case it runs into tens of thousands. There are two giants among them: Lake Ladoga, the biggest in Europe, and Lake Onega. Karelia has many short but deep and fast rivers, including the Kem, the Vych, the Suna, the Vodla and the Shuya.

This territory is rich in minerals primarily of a non-ore character—granite, marble, quartzite, pegmatite, spar, and mica. Karelian marble and granite are widely used as facing material. The Metro stations in Moscow and the Lenin and Stalin Mausoleum are finished with White Sea Tivdiya marble. Shoksha porphyry, an easily-polished, compact, refractory sandstone, is noted for its fine qualities. It has been used for monumental buildings for many a long age. For example, the finish on St. Isaac's Cathedral and the Stone Bridge in Leningrad, and the pedestals of many monuments are of this stone. Porphyry was exported to Paris for the sarcophagus of Napoleon I.

Ore deposits also occur in Karelia. Peat is the only mineral fuel in this territory.

The land bears the traces of huge glaciers. As reminders of the Ice Age, there are numerous boulders, some of which are of a great size. The soil is stony and unsuitable for farming. Agriculture, chiefly animal-breeding, developed only in the south of the republic.

Swamps, boulders, forests and fast rivers make it difficult to build lines of communication in Karelia. The Kirov Railway crosses the republic in a meridional direction. Another important road is the

227-kilometre-long White Sea-Baltic Canal, which was built in 1931-33. Running parallel with the railway, this canal crosses lakes Ladoga and Onega and joins the White and Baltic seas. The waterway between these seas used to follow the lane round the Scandinavian Peninsula and was nearly 5,000 kilometres long. A journey from Belomorsk to Leningrad took from 17 to 20 days but now the canal has shortened the route from the White Sea to the Gult of Finland to only six or seven days. The White Sea-Baltic Canal has considerably lightened the freight traffic on the Kirov Railway.

The biggest towns of Karelia—Petrozavodsk, Medvezhegorsk and Kondopoga—are on this railway.

Petrozavodsk, capital of the republic, is situated on the western shore of Lake Onega, in the mouth of the small Lososinka River. It was founded in the same year as Leningrad, in 1703, but remained virtually a small backwoods settlement right until the Revolution.

Like most of the populated points of the North, Petrozavodsk is a "wooden town," with most of the houses and pavements built of wood. It began to change in the past 15-20 years with the appearance of big brick buildings, asphalted streets, gardens and tree-lined squares. The town has grown in length and breadth, wresting territory from the dense forests around it.

In Petrozavodsk, the largest industrial enterprise is the Onega Tractor Works. A sawmill and a factory making articles from Karelian mica draw upon the republic's timber and mineral riches.

As the scientific and cultural centre of Karelia, Petrozavodsk has the Karelian Branch of the U.S.S.R. Academy of Science, a university, a teachers training institute and two theatres.

North of Karelia, within the Arctic Circle, we find the Kola Peninsula. This peninsula with the adjoining part of the mainland makes up Murmansk Region. A chain of tundra mountain ridges, the Monche-Tundra, which are overgrown with polar and alpine vegetation, stretches across the middle of the peninsula. The tallest of these are the Khibiny Mountains.

The warm Gulfstream flows close to the north-western shores of the Kola Peninsula and influences the climate of this area. Thanks to the Gulfstream, the port of Murmansk, which is situated here, is free of ice all year round.

Economically, Murmansk Region is an industrial area. The chief industries are: first fishing, second mining and chemical, and third timber.

On the Kola Peninsula economic life used to depend on summer fishing, which was concentrated along the Murmansk coast. But today, the economic development of the entire peninsula has been started with the utilization of the vast mineral wealth.

The great Khibiny apatite deposits and the accompanying nepheline deposits were discovered in 1924.

Apatites are the basic raw material for the phosphate-fertilizer industry. Prior to the discovery of the Khibiny apatites, Russia spent millions of gold rubles to buy this raw material in Morocco. The Khibiny deposits yield not only enough raw material for the domestic mineral-fertilizer industry but also enable the country to export apatites. The Khibiny tundra's next most important product is nepheline, a raw material for the aluminium and glass industries. Many modern enterprises extracting and concentrating apatites and nephelines have sprung up in the bare polar tundra, at the southern spur of Mount Kukisvumchorr. The centre of this new industry is Khibinogorsk, now called Kirovsk, which has more than 100,000 inhabitants. A branch line links the factories and the town with the Kirov Railway.

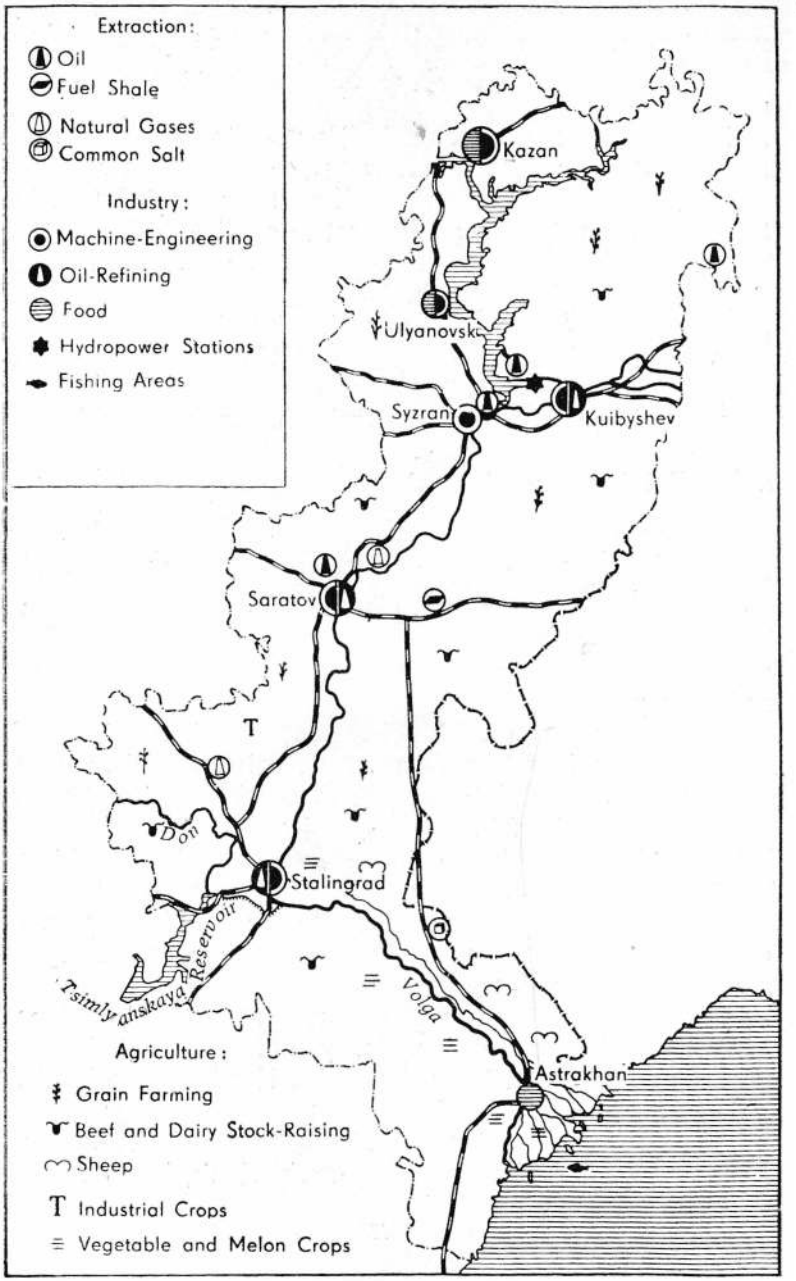
Deposits of non-ferrous, including copper and nickel, and ferrous metals have been found in Murmansk Region and they have given rise to a new industrial town, Monchegorsk, and to the township of Nikel to the north of it.

Murmansk is the most important merchant port and fishing centre within the Arctic Circle. It sends fish to all parts of the Soviet Union. The local fishing artels sell their fish to the Murmanryba Trust, which embraces a huge fishing industry with a well-equipped fleet and auxiliary enterprises.

The port of Murmansk has been reconstructed and equipped with the most up-to-date machinery. Today, it is a port of international significance and the starting point of the Northern Sea Route. There are ship-repair yards in the city.

Kaliningrad Region is the westernmost area of the Russian Federation. The city of Kaliningrad (formerly Königsberg) is a conven-

VOLGA AREA


Extraction:
Oil
Fuel Shale
Natural Gases
Common Salt
Industry:
Machine-Engineering
Oil-Refining
Food
Hydropower Stations
Fishing Areas
Kazan
Ulyanovsk
Syzran
Kuibyshev
Saratov
Stalingrad
Don
Tsimlyanskaya Reservoir
Volga
Astrakhan
Agriculture:
Grain Farming
Beef and Dairy Stock-Raising
Sheep
T Industrial Crops
Vegetable and Melon Crops

ient merchant port on the Baltic for the export of Soviet goods to all parts of the world. After Murmansk, this is the biggest ice-free port and an important base for the fishing fleet operating all year round in the international waters of the Atlantic.

The biggest industrial enterprises in Kaliningrad are the ship-repair yards, the machine works and the cellulose and paper mills.

ALONG THE VOLGA[1]

A small stream, so narrow that it can easily be stepped across, flows in the Valdai Hills in the northern part of the Great Russian Plain. This is the source of the great Russian river Volga. The stream gurgles quietly between trees, cuts across swampland, connects several lakes, accepts the waters of tributaries, and, gathering strength, gradually becomes a huge river. In its lower reaches it is from two to four kilometres wide.

Almost 3,700 kilometres long, which is a tenth of the Earth's circumference, it collects the waters of an enormous basin occupying nearly a third of the Great Russian Plain. In outline the Volga basin resembles a luxuriant tree with its trunk rising out of the Caspian. Each branch, of which there are over 200, is a tributary. Among them are rivers like the Kama, which is more than 2,000 kilometres long, and the Oka, stretching for nearly 1,500 kilometres. Joined by these and other rivers, the Volga empties 252,000 million cubic metres of water a year into the Caspian.

The right bank is high and marks the eastern boundary of a plateau stretching for many kilometres. The left bank is low.

Here is what Maxim Gorky wrote about the Volga: "Bathed in sunlight, the left bank extends to the very horizon as a thick green carpet, while the right bank sweeps aloft its silent, forest-clad slopes. Between them flows the broad-chested river, noiseless, grave and unhurried. The hilly bank casts a black shadow on the waters,

[1] The Volga Area, which is the territory in the basin of the middle and lower reaches of the river, consists of the following administrative units: Tatar Autonomous Republic, Ulyanovsk and Kuibyshev regions (Middle Volga), and Saratov, Stalingrad and Astrakhan regions (Lower Volga).

while the left bank is adorned by golden sand-bars and broad, velvety-green meadows."

The Volgaside expanses stretch without end. The river crosses the forest, forest-steppe, steppe and semi-desert zones.

The biggest forests are situated along the upper and middle reaches. Coniferous forests reign in the upper reaches, where there is an abundance of pines that are used in aircraft-building and firs for musical instruments. Southwards these trees give way to broad-leaved species with magnificent oak thickets and a multitude of limes, birches and elms.

The Volga is beautiful along its middle reaches, where the Zhiguli Hills tower in the Samara Luka. The Samara Luka is a 166-kilometre loop that the Volga makes round a mountain ridge.

The Zhiguli Hills begin where the Usa joins the Volga near Karaulny (Sentinel) Hill. In the old days this was a sentry post, which kept watch over the nomads moving east of the Volga and over the vessels plying the river. The Usa, which cuts across the throat of the Samara Luka, was known as a pirate's nest. The "Volga freebooters" used to go round the Samara Luka by way of the Usa, ambushing the vessels plying the Volga. Mountains stretch along the right bank almost up to the city of Kuibyshev, forming a chain of peaks rising steeply over the Volga and sloping gently away from it. Their sides are heavily wooded and are pitted with gorges and deep ravines. Two centuries ago, the Zhiguli Hills were entirely covered with wild apple-trees and were called the Apple Hills. They allow studying the life of centuries long past. Millions of years ago, huge masses of ice moved here from the north, destroying all life in its path. Amidst the cold, lifeless ice enveloping the entire Great Russian Plain, the Zhiguli Hills stood out like an inaccessible island. The glacier did not get at them with the result that extremely rare representatives of the vegetable kingdom of the Tertiary Period have survived there to this day. Rare trees like the Phellodendron Amurense Rupr., the Manchurian nut-tree, the Far-Eastern cedar, the Daur fir and the Amur grape have been brought to these hills from other regions. These trees have acclimatized themselves and are bearing fruit. The animal kingdom of the Zhiguli Hills is likewise rich. It includes the elk, the spotted deer, the racoon-dog, the fox, the mar-

ten and the squirrel. Ducks abound on the Volga islands. Swans make their home there in spring.

In summer, the Zhiguli landscape is bewitching. Forests make a carpet of greenery on the slopes. Birch saplings look down from the sheer precipices, and higher still, on the crests of the mountains, stand stately pines, the descendants of those that grew in the Ice Age. On the slopes, the meadows are bright with flowers. The left-bank steppes stretch farther than the eye can see. The mighty waters of the Volga roll far below and the barges and ships on them look as though they were toys.

Below Stalingrad the landscape changes.

The mountains disappear from the right bank and the Volga, two kilometres wide, flows between low-lying banks. There is nothing but a desert steppe-land all round. This is where the fishing territory begins. Fishing villages dot the banks and the islands. Everywhere nets are dried and barrels of fish tower in pyramids. Countless boats are tied to the bank. The ripples play in the sunbeams and gulls scream as they chase the fish teeming in the river.

The first thing that strikes the visitor in spring is the vast territory covered by the flood-waters. In the section between Stalingrad and Astrakhan, the flood-waters rise in a formidable deluge, reaching from 20 to 40 kilometres in width. A ship has to pick its way through an intricate, tangled system of streams, channels and branches that are only known to the experienced pilot.

When the water gradually begins to recede, islands come to light, changing into thickly overgrown land masses. Everything begins to turn green and burst into blossom.

Rushing towards the Caspian, the river fertilizes a huge area known as the Volga-Akhtuba Floodland. This is a huge valley between the Volga and its left branch, the Akhtuba, which separates from the Volga somewhat above Stalingrad. For more than 500 kilometres it flows near the Volga at distances varying between 15 and 40 kilometres. At Astrakhan, the Volga-Akhtuba valley gives way to the Volga delta. The soil of the delta consists of countless deposits of fertile silt carried here by the flood-waters.

The delta steadily expands because of alluvium deposited by the river, as a result of which it extends seaward forming great sand-

banks. When the flood-waters subside, the delta takes the shape of a network of lakes, streams and channels with masses of exceptionally fertile soil between them.

Thanks to the warm climate and the abundance of sunlight, this soil yields bumper harvests of fruits, vegetables and melon and industrial crops, wheat and rice. Little wonder, then, that this part of the Volga is called the Soviet Nile.

Here large areas are occupied by reeds and by meadows with lush grasses. The young reeds are used as a fodder for livestock, while the older plants—as fuel and a building material. Rare plants like water caltrops, water ferns, salvinia and marsilea occur in the Volga delta. As in the delta of the Nile, the ancient lotus, locally called the Caspian rose, grows here.

The animal kingdom of the delta is likewise rich and varied. Pink and white pelicans as well as curlews that resemble the sacred Egyptian ibis build their nests here in the summer. There are great flocks of snow-white swans, graceful grey and yellow herons, cormorants, and vividly coloured pheasants. Boars hide in the rushes. Otters show themselves here and there. These places are guarded by the state and a scientific reservation has been set up.

Fish form the chief wealth of the delta. The branches and channels are where they spawn and fatten. During the spring floods, the delta turns into a vast fish nursery. Together with the Volga-Akhtuba Floodland, it is part of the Volga-Caspian fishing region. Enormous numbers of fish are caught in the shallow northern part of the Caspian adjoining the Volga and in the delta.

The Caspian is one of the richest fish-bearing regions in the world. It yields (particularly during the spring season) great quantities of herring and grey mullet; in autumn—pike-perch, sheat-fish, bream and lampreys. Many valuable species of fish (sturgeon, salmon and sevryuga) are caught. There are big schools of sprat, which are caught at night with the aid of underwater illumination—electric lamps fixed to the nets to attract the fish.

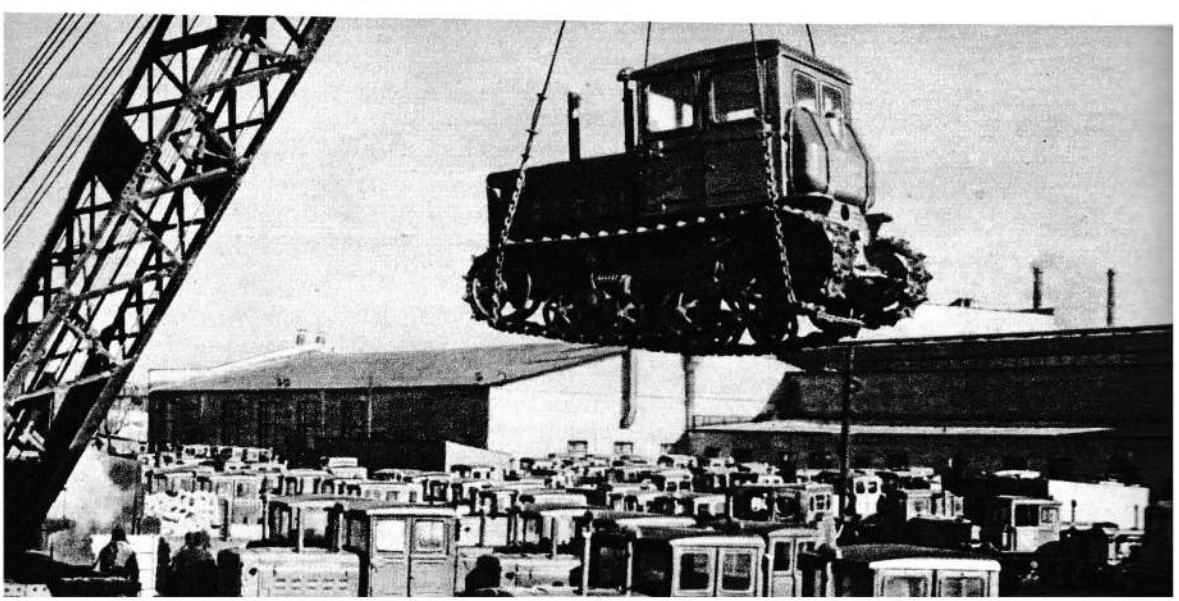
Extensive work has been done in recent years to enrich the Caspian with new species of fish. The grey mullet was brought from the Black Sea back in the thirties. The conditions in the Caspian proved to be suitable and today bigger grey mullet are caught in the Caspian

View of Stalingrad from the Volga

Kuibyshev "Sea," which was formed after the dam of a hydropower station was thrown across the Volga

Beluga from the spring catch at the Astrakhan Fish-Canning Works

Stalingrad Tractor Works



than in their original home. Large quantities of sea worms, of the genus Nereis, a valuable food for many species of fish, were brought from the Sea of Azov.

A feature of the Caspian is that it has many species of migrating fish that spawn in rivers and then return to the sea. For that reason its fish resources are largely dependent on hydrotechnical structures that change the regime of rivers. The breeding of fish like the grey mullet, which spawns in the open sea, is favourably promoting the fishing industry of the Caspian.

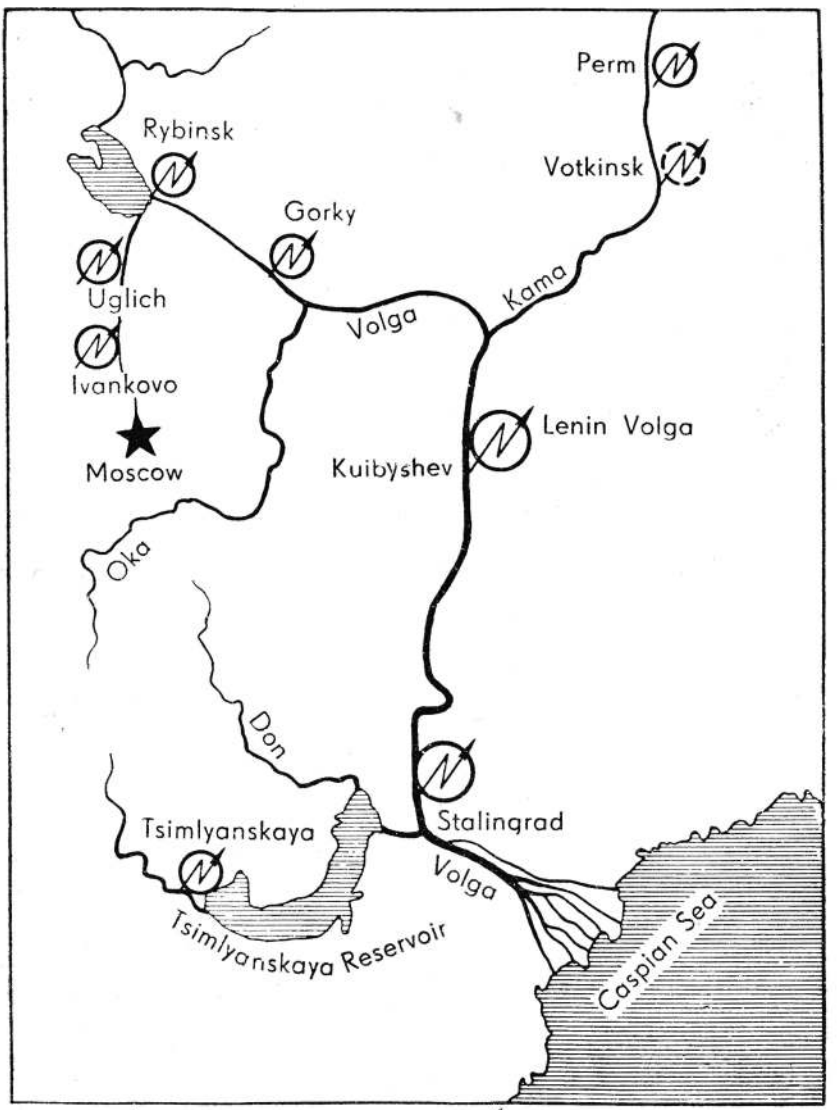
Seal-fishing is an important occupation. In the North Caspian they are caught on the ice in winter, and along the coast in summer.

The number of spits and sandbanks has increased greatly in recent years. This is the result of the falling level of the sea. Soviet hydrologists have established that the Caspian is not drying up as was thought formerly but that its level depends on the size of the flow of the rivers draining into it. A steady low water-level brought about by a drop in precipitation has been observed in the period between 1930 and 1946 in the basin of the Volga, which is the chief water artery feeding the Caspian. The Caspian received much less water from the Volga than in normal years and that brought about a sharp drop in its level.

In spite of the enormous flow of water in the Volga, navigation was until recently impeded by the numerous shoals. For a time this situation was remedied by dredging. But alluvium continued to be deposited and the fairway changed. Life demanded that the Volga be converted into a deep-water lane. Another important task was to use the waters of the Volga to irrigate the unbounded fertile but arid land along all its length. But the chief thing that the Volga could give was power that was needed so much by the cities, standing in a chain on its banks, and by agriculture.

A project for a fundamental over-all reconstruction of the great river, known as the Great Volga Plan, has now been almost completely realized. It provided for the building of a cascade of hydropower stations and large reservoirs, which would make it possible to utilize the river's tremendous energy, to convert it into a deep waterway between the northern and southern seas and to irrigate the arid lands east of the Volga.

UTILIZATION OF THE VOLGA AND THE KAMA



Operating Hydropower Stations

Hydropower Stations Under Construction

Giant reservoirs, known as the Moscow, Rybinsk, Gorky and Kuibyshev seas, have already been built. They have the majestic appearance of real seas with the shores lying far out of sight. In the Rybinsk Sea, for example, the distance between the shores exceeds 70 kilometres. North-westerly winds frequently blow in this sea, raising violent storms with a wind force as high as ten. These are real sea-storms and for that reason the motor vessels plying the Volga seas have reinforced hulls.

Construction of many links of the Volga cascade—the Ivankovo, Uglich, Shcherbakov and Gorky hydropower stations—has been completed. All the 20 units of the Kuibyshev Hydropower Station with an aggregate capacity of 2,100,000 kilowatts have been commissioned. Today, this is the biggest power station in the world, its capacity exceeding that of the Grand Coulee power station (1,974,000 kilowatts). Construction has been started on the Cheboksary Hydropower Station, while the 2,310,000-kilowatt Stalingrad Hydropower Station, the biggest on the Volga, will be placed in operation in 1960.

It has been estimated that up to 60,000 million kilowatt-hours of electricity could be generated if full use were made of the Volga and its tributaries.

The Volga has become the major power centre of the European part of the U.S.S.R. High-tension lines carry electricity from here to Moscow and other important industrial centres. The Volga hydropower stations are linked up with the power systems of the Great Dnieper, the North Caucasus and the Donbas.

Dams have turned the Volga into a deep waterway allowing river vessels to reach Moscow via the Uglich hydropower development and the Moscow Canal. The Rybinsk Dam, which resulted in the artificial Rybinsk Sea, has also raised the water-level of the Sheksna River, thus linking the Volga directly with the Baltic Sea, while the Volga-Don Canal, built at Stalingrad in 1952, connects the Volga with the Black Sea. At the same time, the dam of the Kama Hydropower Station, which raised the water-level in the Kama River, facilitated navigation between the Volga and the Arctic Ocean and the rivers of Siberia via the Pechora.

Along its lower reaches the Volga irrigates huge areas of arid but extremely fertile land where dry winds blow. The southern cherno-

zem of the feather-grass steppes in the Caspian Lowland changes to dark-chestnut soil spotted with salt patches and marshes.

The Volga steppes make a lovely picture in early summer when up to the very horizon they are covered with a fragrant carpet of flowering grasses. This carpet forms a light-yellow background for the purple-red, peonies yellow loco-weed, lilac cockles, field sweet peas ranging in colour from pale pink to bright red and purple, and hard, prickly blue weed. The air is filled with the scent of bitter wormwood, the buzzing of bees and the silvery chirping of skylarks.

The riotous flowering of grasses marks the haymaking season. Wheat ripens soon after and tense field work begins. First, the wheat is harvested and then the maize and sunflowers.

At the close of summer the hot sun dries the bare steppe, making it yellow-brown.

The extensive meadows and the floodlands ensure great fodder resources for animal-breeding in the Volga Area. Winter pastures are of great importance in the south.

There are many minerals in the Volga Area, the chief being oil and natural gas. The discovery of oil in this region was of tremendous importance for the economy not only of the Volgaside but also of the entire country. The travel notes of the 18th-century Russian explorers Ivan Lepekhin and Pyotr Pallas describe the oil and sulphur springs in the basins of the Sok and Sheshma rivers, and the deposits of sulphur and asphalt in the Samara Luka. Later, in the 19th and early 20th century, the geologists Alexander Karpinsky, Alexei Pavlov and Gennady Romanovsky confirmed the presence of oil in these regions. But Nobel, Mantashev and the other owners of the Baku oilfields had the oil monopoly firmly in their hands and did not permit competitors. The oil discovered in the Volga Area by Russian geologists was forgotten for a long time.

Investigations were resumed in this oil region in 1928 under the leadership of Academician Ivan Gubkin. The Syzran oil deposits were discovered in 1935, and the Stavropol deposits in 1937. At the 17th International Geological Congress in 1937, it was pointed out that there were big reserves of oil in the Volgaside. Today, oil has been discovered throughout this region. This discovery has made the Volga Area part of the huge oil region between the Volga and the Urals.

Called the Second Baku, this region is being steadily expanded and has already crossed to the right bank of the Volga. The deposits in Kuibyshev, Stalingrad, and Saratov regions, in the Tatar Republic and other places are already yielding millions of tons of oil.

The honour of discovering huge quantities of oil in Devonian rock —this is the first time it was done in the Soviet Union—belongs to the oilmen of Kuibyshev. This marked the beginning of a fresh upswing of the Soviet oil industry.

Natural gas occurs in many places in the Volga Area. Particularly big deposits have been found in the Saratov and Kuibyshev regions, which supply gas not only to the Volga towns but also to Moscow and the industrial centres on the way. In four years, utilization of the gas deposits of Kuibyshev Region has saved more than a million tons of conventional fuel and freed more than 60,000 railway cars which would ordinarily have been used for the transportation of fuel.

The Middle Volga has rich deposits of combustible shale, a low-calorie fuel. The convenient thing is that the location of some of these shale deposits allows utilizing them for underground gasification. The Volga shale reserves are inexhaustible and today the task is to organize the over-all utilization of these reserves for the output of gas, benzine, kerosene and chemical products.

Brown coal has also been discovered in the Volga Area (Tatar A.S.S.R.). Some of these deposits are important industrially and are being worked.

The Volga Area abounds in salt lakes. The biggest of these are lakes Elton and Baskunchak, which are situated at the Kazakhstan frontier. The size of the salt reserves in Lake Elton is shown by the fact that although more than nine million tons of salt has been extracted here in the past 150 years, there is no noticeable loss of salt in the lake. The common salt from Lake Elton is now used as a raw material for the production of magnesium chloride. An indication of how huge the reserves of salt are in Lake Baskunchak is that a well sunk to a depth of nearly 300 metres did not reach the bottom of the salt layers.

There are enormous deposits of different kinds of mineral building materials in the Volga Area. The marls of Saratov Region serve as

raw material for the Volsk group of cement works. Chalk deposits stretch for more than 150 kilometres along the right bank of the Volga, from Ulyanovsk to the Samara Luka. Huge reserves of gypsum are concentrated in the Tatar Autonomous Republic and other places. This gypsum goes to the alabaster works in Gorky, Yaroslavl and other regions. Volga gypsum is also used for the Moscow Metro. Another Volga mineral, tripoli, is used for the production of various building materials. The Zhiguli Hills have deposits of limestone and dolomite as well as sands, many of which are suitable for the glass industry.

In the oil-bearing regions there are deposits of asphaltites and goudrons, the biggest of which are in the Samara Luka, in the basin of the Sok.

Modern geologists have fundamentally changed the former view about the Volga being a region with hardly any mineral wealth. Today, more and more of the wealth of this territory is being drawn into the service of man. In pre-revolutionary Russia, the Volga Area was chiefly a granary, but in our day it has been transformed into a big industrial region with highly developed oil, gas, engineering, metallurgical, chemical, power, building materials, wood-working, food and light industries.

In 1956, the Volga Area produced 10,400 million kilowatt-hours of electric power, 2,300 million cubic metres of natural gas and 1,700,000 tons of steel.

At the same time, the Volga Area continues to be one of the most important farming regions in the Soviet Union. Nearly 14 per cent of the Russian Federation's crop areas are in this region. Grain and industrial crops predominate here, the chief grain crop being wheat. The areas sown to maize have been considerably extended in recent years. The Volga Area produces 11 per cent of the grain grown in the R.S.F.S.R. Cultivation of sunflowers (nearly 20 per cent of the total produced in the R.S.F.S.R.), mustard and *makhorka* is an important branch of farming in the region. Vegetables (including potatoes) and melons are widely grown. Particularly large quantities of vegetables are yielded by the Volga-Akhtuba Floodland. From here vegetables are sent to many parts of the country and to canning factories. The southern regions of the Volga Area are famous for

their melons and water-melons. Big barges carry them to the central and northern regions of the Federation.

Crossing regions with great forest, oil, fish, salt, grain and vegetable wealth, the Volga facilitates the goods turnover between them. It is one of the principal transport arteries in Russia, connecting the Volga Area with the central regions, the Baltic republics, the Urals, the North and the Caucasus. The river takes care of almost half of the goods turnover of the Soviet river transport.

More goods are transported up than down the river. The former include Caucasian oil and grain, Central-Asian cotton, Stalingrad tractors and high-grade steel, Astrakhan fish, Baskunchak salt, and Lower Volga water-melons, vegetables and fruit. Huge quantities of timber are rafted down the Volga from the northern regions. Big rafts are hauled by tugboats. At Stalingrad, a part of this stream of timber is channelled along the Volga-Don Canal to the Donbas, the Lower Don and the Caucasus. Metal and machinery also come down the Volga from the central regions and from the Urals.

Today, the Volga water transport faces new tasks as a result of the conversion of this river into a deep waterway and the construction of large reservoirs that have changed the conditions for navigation. The country is building improved and more powerful river vessels—diesel ships adapted for navigation in the "Volga seas."

The biggest cities in the Volga Area are Kazan, Ulyanovsk, Kuibyshev, Saratov, Stalingrad and Astrakhan.

Kazan, capital of autonomous Tataria, has long been occupying a prominent place among the towns of Russia. With a population of 643,000 people, it plays a big role both as a cultural and a scientific centre. Suffice it to say that prior to the Revolution it had four institutions of higher learning and one of the six universities in the country. Famous names like those of the mathematician Nikolai Lobachevsky, the chemist Alexander Butlerov and the author Lev Tolstoi are associated with Kazan University. Vladimir Lenin also studied at this university.

In Soviet times, Kazan preserved and enhanced its cultural importance.

Today, the city has 11 institutions of higher learning, a number of big research establishments, and a branch of the Academy of

Science. More than a thousand Tatar students are now studying in the higher schools of their republic. What a contrast to pre-revolutionary times when in the 113 years of its existence Kazan University trained only six Tatars.

Prior to the Revolution, Kazan was "famous" for its soap. The soap industry has remained in Kazan, but soap is no longer produced by artisans with primitive machines but by a big modern fat works which produces not only soap but also candles, stearin and glycerine. Similarly, the primitive fur, leather and foot-wear enterprises have been substituted by the biggest fur works in the U.S.S.R., a leather and foot-wear factory and an artificial leather works. The largest fulling and felt industry in the Soviet Union has been established on the waste of Kazan's leather and fur industries. However, it is not the light but the engineering industry that holds first place in Tataria's capital today. It produces hoisting and transport equipment, and typewriters. The chemical industry in Kazan is developing successfully.

The town of Ulyanovsk, formerly Simbirsk, is known to the whole of progressive mankind as the birth-place of Vladimir Ulyanov-Lenin (1870). Lenin finished the local *Gymnasium*. The house where the Ulyanov family lived is now a museum.

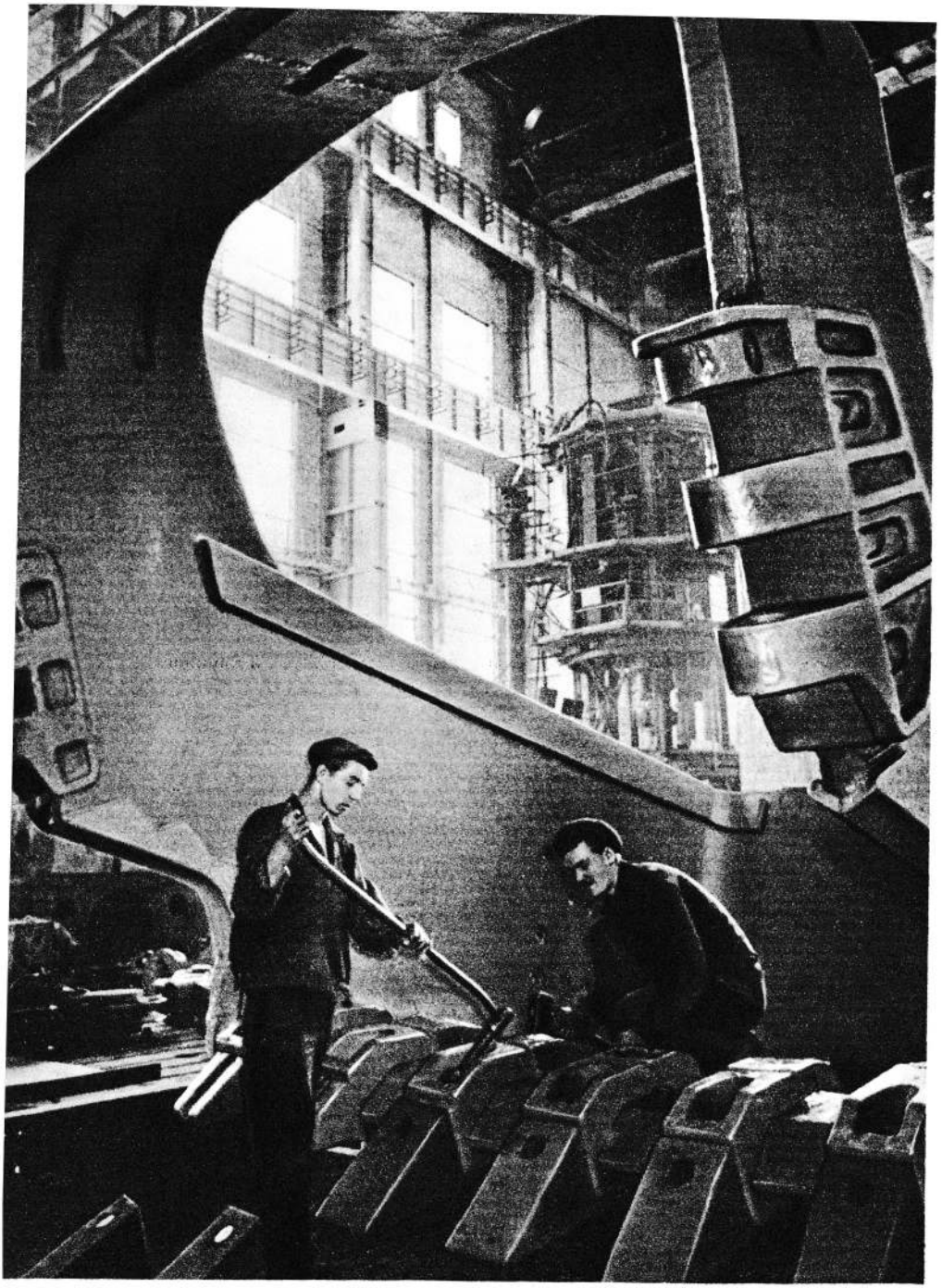
Ulyanovsk is one of Russia's oldest seats of culture and has produced many eminent scientists and writers, including the historian Nikolai Karamzin, the writer Ivan Goncharov and the poet Nikolai Yazykov. The Ulyanovsk Library, founded in the first half of the 19th century, has a large number of rare books and valuable manuscripts. There are many educational establishments, including higher schools, in the town.

Modern Ulyanovsk has become an important industrial centre. It produces cars, giant lathes and small-displacement motors. The Kontaktor Works manufactures electrical equipment, part of which is exported.

On the eastern side of the Samara Luka, on the left bank of the Volga near the mouth of the Samara River, stands one of the most important economic and cultural centres of the Volga Area—the city of Kuibyshev with its population of 806,000 people. In the past, this city, which was called Samara, was a trading centre and the chief

Inter-collective-farm power station in the Kabardino-Balkar Autonomous Republic

Voroshilov Health Centre, Sochi



Assembling the bucket of a walking excavator at the Urals Machine Works.

junction on the Volga. The main items in its trade turnover were first wheat, then animal products—fat, leather, as well as sheep driven here from the Trans-Volga, Orenburg and Kazan steppes. Big, nationally important enterprises were built in Kuibyshev as it developed economically in the years of socialist reconstruction. Today, Kuibyshev is a centre of the engineering industry. The city produces lathes, carburettors, tractor parts, ball-bearings and cinema apparatus. There are ship-repair yards. After the commissioning of the Kuibyshev Hydropower Station, which supplies electricity to the enterprises in the city itself and to many regions in the Volga Area and the Centre, Kuibyshev became an important power base.

Kuibyshev occupies an area of 35 kilometres along the Volga and 13.5 kilometres perpendicular to it. This shows the size of the city. Its streets are laid out in straight lines and there is plenty of vegetation. A new district has been built up to the north of Kuibyshev with sanatoriums, holiday homes and summer cottages surrounded by luxuriant gardens and parks.

The city's rise as a cultural centre is shown by the fact that it now has seven institutions of higher learning where prior to the Revolution it did not have a single one. Most of these are engineering and technical institutes and this conforms with Kuibyshev's economic profile as a centre of a highly developed industry, and with the industrial development of the entire Volga Area.

A glance at a geographical map of the Volga Area will show us that there is a chain of towns south of Kuibyshev. These are Balakovo, Volsk, Marx, Engels and Saratov.The biggest of these is Saratov. It may be safely said that the other towns mentioned above are its satellites.

Saratov is a big industrial and cultural centre with a population of 581,000 people. It has large factories producing farming machinery. The Saratov cracking mill refines oil into benzine, kerosene and lubricants. The country's biggest synthetic-alcohol factory was opened in Saratov on the eve of the 40th anniversary of the October Revolution. In place of the old railway workshops there is a carriage-repair works. Saratov manufactures foot-wear machines, gear-cutting lathes and tractor parts. It has huge ball-bearing and wire and

nail works, furniture factories, a meat-packing plant and other enterprises.

Like Kuibyshev, Saratov is an important railway junction, the cross-roads of railways from Central Asia, the Centre, the Upper and Lower Volga, and the Caspian Sea. The city's wharves handle heavy freight and passenger traffic. A railway bridge spans the Volga a few kilometres below the city.

Saratov is also important as a cultural centre. The oldest of its 11 institutions of higher learning is the university which bears the name of the great Russian revolutionary-democrat Nikolai Chernyshevsky, who was born and spent his youth in this city. Saratov has several theatres, including an opera and ballet, a dramatic and a young spectator theatre.

The discovery of sulphur springs near the city holds out the prospect of Saratov becoming a balneological spa.

Some 300 kilometres south of Saratov we find Stalingrad, which has entered Russia's history as a hero-city at whose walls the destiny of the country was decided on two occasions. The first was in 1918, when Stalingrad (then Tsaritsyn) witnessed the defeat of the counter-revolutionary army led by Ataman Krasnov, which put an end to the attempts by Denikin and Kolchak to establish a united front against the young Soviet Republic. The second was in 1942-43, when a crushing blow, which decided the outcome of the Second World War, was dealt the Nazi armies.

After the war, the hero-city was raised from ruins and built in accordance with a general plan. It has become even more beautiful and majestic than it was before the war. Today, a huge city with broad, tree-lined streets and multi-storeyed brick houses stands in all its beauty on the Volga. The main thoroughfare, which runs along the river, is more than 60 kilometres long. A new industrial town has been built on its southern outskirts, beyond the Volga-Don Canal. The city also includes the settlement of Rynok, near which the Stalingrad Hydropower Development is rising. Together with its new districts the city is 70 kilometres long. The esplanade has been transformed into a boulevard.

One of Stalingrad's handsomest thoroughfares, Peace Street, leads to the Square of Fallen Soldiers, from which the Avenue of Heroes

lined on either side by the bronze busts of Stalingrad's famous defenders runs to the Volga. This avenue ends in a granite staircase descending from the high bank to the riverside station.

Stalingrad has been transformed into one of the Soviet Union's most important industrial centres with a big heavy industry. The city's industrial capacity considerably exceeds the pre-war level. Stalingrad is widely known for its tractor factory and for its iron and steel works, the Krasny Oktyabr, which puts out special kinds of steels. The city supplies high-grade metal to many engineering factories in different parts of the country. Modern settlements have sprung up round Stalingrad's factories.

The town of Krasnoarmeisk has merged with Stalingrad. It builds comfortable passenger diesel ships and other vessels, as well as pumps for the Volga Area oil-fields.

Industrial expansion is continuing in Stalingrad. The projects under construction at the moment are an aluminium works, the second section of a plant prefabricating reinforced-concrete elements for housing construction, and a factory for the production of building materials.

Large-scale cultural construction is proceeding side by side with the city's economic development. Since the war, the city has built more than 100 schools, 100 hospitals and polyclinics, 170 children's establishments, 3 theatres, 18 cinemas, 50 clubs and palaces of culture and a planetarium.

The population of this rejuvenated city has grown immensely, totalling 591,000 people in 1959.

Astrakhan with its population of 294,000 people is the southernmost of the big towns on the Volga. It is situated in the delta of the river, on islands 100 kilometres from the Caspian. Cut up by the delta, the town has 31 bridges.

Astrakhan has always been a fishing town. But there can be no comparison between the primitive merchant fisheries of the past and the big modern mechanized Mikoyan Plant. The other leading enterprise in the town is the ship-building yard, which not only builds fishing-vessels but also produces diesel engines and all kinds of equipment for the mechanized fishing industry.

One of the major inland ports in the country, Astrakhan, is where Azerbaijan oil is transferred from sea tankers to river vessels.

IN THE SOUTH OF RUSSIA

In the south of the European part of the Russian Federation lies the Northern Caucasus, a land of extensive fertile steppes and great snow-capped mountains.

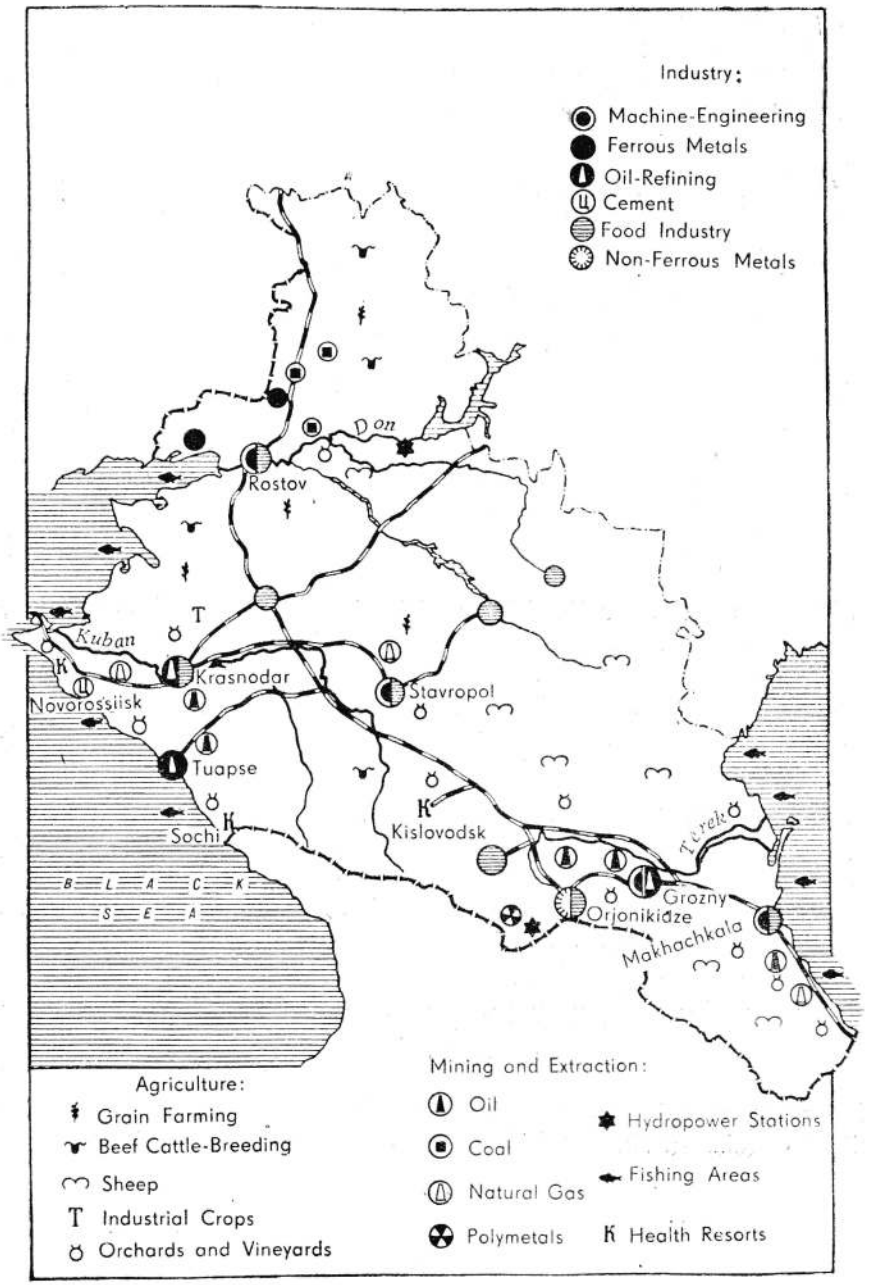
The wooded, ravine-pitted Caucasian Mountains with their peaks clad in eternal snow stretch for more than 1,000 kilometres from the Black Sea to the Caspian. The four parallel ranges forming these mountains—the low Pastbishchny Range or Black Mountains, the Skalisty, the Bokovoi and the Main ranges—rise one after another like steps in a mammoth ladder. In clear weather they can be seen in all their diversity of colour and outline. The Black Mountains with their dense dark-green forests do indeed look almost black. The mountains of the Skalisty Range are reddish-yellow. Behind them towers the silvery-white chain of summits of the Bokovoi Range, including the great peaks of the Caucasus—Elbrus, Kazbek, Shkhara, Dykh-Tau, Koshtan-Tau and Jangi-Tau, each of which is more than 5,000 metres above sea-level. Fifteen of the Caucasian Mountains are taller than Mont Blanc.

The 5,633-metre-high twin-peaked Elbrus, which has no rival in Europe, rises like a huge snow-white tent above the surrounding mountains.

Seen from the foot of Mount Elbrus, the dawn makes a never-to-be-forgotten picture. The Main Range shows dimly through the grey haze of the early morning, while the twin-peaked colossus is seen in all its glory with the sun shining brightly on it. The cones of these two peaks seem to hold up the clouds. Gradually, one after another, the other peaks come into view. White clouds rise slowly from the valleys and the sun finally drives the darkness away.

Mount Elbrus is an extinct volcano with two cone-shaped peaks divided by a saddle-like declivity and sitting on a common foundation. It displayed its formidable strength on at least four occasions, when streams of white-hot lava flowed down its sides and ash was carried for hundreds of kilometres around. There was a prolonged interval between each of these eruptions in which the summits would be covered with snow, and then, finally, an armour of ice settled down on them for ever.

THE NORTH CAUCASUS



The glacier on Mount Elbrus is about 144 square kilometres in size and in some places the ice is 400 metres thick. The feature distinguishing the glaciation on this mountain is that the névé basin covering the volcanic cones gives rise to glaciers which, fanning out, slide down the slopes in different directions.

The Kuban, the Terek, the Sulak and their numerous tributaries rise from the glaciers of the Caucasian Mountains. The fast streams form deep ravines. These include the Daryal, the Alagir, the Cherek and the Chegem ravines in the central part of the range, and the Sulak Canyon and the Samur Valley in Daghestan. Some of the ravines narrow down to 25-30 metres, so that only a thin strip of sky can be seen from the bottom.

The great gorges of the Daryal Ravine have been described by the poets Alexander Pushkin and Mikhail Lermontov and depicted on canvas by outstanding Russian painters.

Among the picturesque ravines of the Caucasus, attention is drawn by the Chegem Ravine. A road has been cut into its sheer stone walls that rise high above the Chegem River. In the sombre gorges it is semi-dark, damp and cool even on a hot summer's day. Numerous waterfalls shoot over the high multi-coloured cliffs. Some fall in a mighty shower, others form cascades and, breaking against projecting rocks, fill the air with spray. The sunbeams reflected in the spray paint the ravine with all the colours of the rainbow. Here and there the ravine widens out giving way to meadows and gentle, densely wooded slopes. In winter the waterfalls freeze, forming numerous fantastically shaped pillars of ice.

The Alagir Ravine, which is the valley of the Ardon River in Northern Ossetia, where the Ossetian Military Road runs, is just as interesting.

Professor Andrei Krasnov, the geographer, wrote: "As a student I hiked through the Saint Gothard Pass in the Alps and, like the impressionable youth that I was, admired the majestic beauty of the Reiss Ravine, the Devil's Bridge, the alpine meadows and the sharp contrast between the landscape of the Italian Switzerland and the slopes of the Alps which I had just left. And yet, I must confess that after comparing the sombre pine thickets and the wild Ardon Ravine with the Reiss Ravine, and the Vladikavkaz Steppe with the environs

of Kutaisi, I found there was a tremendous difference. A journey across the Caucasus along the entire Ossetian Road is worth long wanderings through several states and localities."

A whole labyrinth of mountain ravines with mighty rivers can be seen in Daghestan, which is situated in the eastern part of the Caucasus.

North of the central part of the Great Caucasus, near Mount Elbrus, are the Pyatigorye or Five Mountains. Several low mountains —Mashuk, Zheleznaya, Verblyud and others with the five-peaked Beshtau as the biggest—stand in an open steppe. These mountains arrayed in groups or singly are of volcanic origin. As these laccoliths took shape they rose and in places cut through the tertiary and cretaceous strata. Originating at great depths, the laccoliths provided an outlet for strongly mineralized water—the *narzan* water in Kislovodsk, the Smirnovsky and Slavyanovsky chalybeate springs in Zheleznovodsk, the hydrogen sulphide waters in Pyatigorsk, the combined-mineral waters in Yessentuki and other springs of the group of mineral-water spas. In the upper reaches of the Malka River, north of Mount Elbrus, is a deep ravine called the Valley of *Narzans* because of the abundance of springs yielding this medicinal water. In Kabardinian, *narzan* means potent water. The Kabardinian people have many legends about the miraculous power of these springs. One of these legends says: "There is an unusual well where the snow-covered mountains of the Caucasus separate the steppe from the southern lands, where herds of horses graze in the hilly steppes of Kabarda. If death approaches and you want to live, you have only to bathe in this well to live for a long, long time. If a bullet or sword wound pain you, you have only to bathe in this well for the pain to disappear. . . ."

Some of the districts of the Central Caucasus (the more mountainous part of the Great Caucasus) likewise have mineral springs with carbonaceous, alkaline and sulphur waters.

The volcanic soil contains other riches. In the Central Caucasus there are big deposits of rare metals, zinc and lead. Silver, gold, arsenic and iron occur. The deposits of building materials are particularly big and they include limestone, marls, clays, sands, volcanic tufa, ash and pumice-stone. Volcanic tufa is a fine light

building material with great mechanical strength and low heat conductivity.

North of the Caucasian Mountains lies an extensive plain. There at a comparatively small depth in a bend of the Don are concentrated great deposits of coal, which are the eastern continuation of the Donbas deposits, while around Grozny, in the Kuban area and along the Caspian there is an enormous reserve of oil. The Soviet Union's biggest reserves of natural gas were discovered quite recently in the Stavropol Plateau, which is situated in the heart of the plain north of the Caucasus, and in the Kuban area. Gas has also been found in the oil-bearing regions near Grozny, in Daghestan, in the Taman Peninsula and along the Don.

The Caucasian Mountains are thickly wooded. Broad-leaved species—beech, alder, hornbeam, maple, ash, linden, poplar and elm—predominate on the northern slopes of the Skalisty Range and the Black Mountains, where the precipitation is quite high. The best forests are in the mountains of the humid districts of the Black Sea coast. These consist of the Caucasian oak and the box-tree, which are widely used for a big variety of articles.

The animal kindom is well represented in these forests.

The boars abounding there are a great attraction for hunters. The roe is met frequently, while the red Caucasian deer is a typical representative of the fauna of the Western Caucasus. The strong and handsome mountain goat is found only high up in the mountains. The Caucasian chamois inhabit the alpine meadows and the sides of the Main Range. There is a particularly large number of animals in the Caucasian and Teberda reservations. The Caucasian State Reservation breeds aurochs and other rare animals, while the spotted deer and the racoon-dog are bred in the Teberda Reservation. The Caucasian mountain turkey and the Caucasian wood-grouse, which live only in these mountains, occur in the forest zone.

Alpine meadows begin beyond the forest zone at an elevation of about 1,400 metres. They are in bloom from early spring till late autumn and the grass is so tall that a rider on a horse can easily hide in it.

These meadows are splendid pastures. In winter the livestock are driven down the slopes to the plain. The plain north of the Cauca-

sian Mountains and the Lower Don, a large part of which is covered with southern chernozem and dark-chestnut soils, comprises the main farmland in this territory. Once these were great grass steppes, but now the Don, the Kuban and the Stavropol steppes have been widely ploughed up and in summer are turned into fields of wheat that alternate with fields under maize and sunflowers. This area grows large quantities of fruit and vegetables. Many forest shelter belts have been planted here.

Considerable changes have taken place in the Salsk Steppes, which are situated in the western part of the plain north of the Caucasus. Not so very long ago they were a semi-desert with no gardens or trees. The Astrakhan dry winds and the "black sand-storms" made farming difficult. Today, the Salsk Steppes cannot be recognized. They are criss-crossed by forest shelter belts, and ponds and reservoirs have appeared. Construction on the Salsk Storage Lake in the middle of the steppe was completed in 1948. Substantial areas have been irrigated and planted to wheat, maize, rice, vegetables, industrial crops, orchards and vineyards.

A moisture shortage is felt not only in the Salsk Steppes but also in other parts of the plain north of the Caucasus. This has given rise to highly developed artificial irrigation, the water being drawn from the Don, the Kuban and the Terek.

Many difficulties had to be overcome before these rivers could be used as a source for irrigating the arid steppes. Only recently these rivers used to overflow their banks during the spring floods causing tremendous damage to farming in the plain. The Terek was the most unruly of these rivers. Accumulating in the lower reaches of the river, the alluvium used to raise the water to three or three and a half metres above the level of the surrounding countryside. Sometimes the floods destroyed orchards, vineyards and crops. Yet, in the end, the Terek was subdued and its energy was made to serve the national economy. Dams, reservoirs and canals were built on the Terek, the Kuban and the Don and these made it possible to control the rivers during the flood season and utilize the terrific pressure of the water as a means for generating electric power and for irrigating fields. Today, farming in this plain has been almost completely freed from the threat of natural calamities.

Completed in 1948, the Nevinnomyssk Canal, a link of the big Kuban-Yegorlyk Irrigation System, plays an important role in watering the Stavropol Steppes. This canal, which begins at the town of Nevinnomyssk, channels a part of the Kuban's waters into the shallow Yegorlyk River.

The Lenin Volga-Don Canal and the Tsimlyanskaya Hydropower Station were commissioned in 1952. The Volga-Don Canal, which is 101 kilometres long, is a colossal structure. The waters of the Don at Kalach and of the Volga at Stalingrad are at different levels and a huge "ladder" consisting of 13 locks with central automatic control was built in order to afford a passage from one river to the other. Along the canal there are three storage lakes into which water is fed by three pumping-stations. The most important component of the Volga-Don Canal Scheme, the Tsimlyanskaya Hydropower Development, consists of a storage lake known as the Tsimlyanskaya Sea, which is almost eight times bigger than the Moscow Sea, and a hydropower station which supplies electricity for industry, transport and agriculture in the Lower Don and the Lower Volga.

Before the Volga-Don Canal was built, nearly 80 per cent of the Don waters emptied uselessly into the Sea of Azov. This situation was changed sharply by the Tsimlyanskaya Storage Lake, which regulates the flow in the Don, accumulates water for the canal, deepens the waterway in the Upper and Middle Don, irrigates a great expanse of arid land and supplies energy to the Tsimlyanskaya Hydropower Station.

Irrigation canals will fan out from the Tsimlyanskaya Storage Lake. The biggest of these, the Don Canal, which has already been partially built, will be 190 kilometres long. It will be the stem for the Lower Don, Upper Salsk, Bogayevsky and Sadkovsky branch canals and will supply water to the 90-kilometre Azov Canal. The Chir distributive canal will run parallel with the Don's old channel which is now a storage lake.

The Lower Don Canal is already irrigating a considerable part of the arid land in Rostov Region. Irrigation is already covering a part of the land in the zone of the Azov Canal, and in the region of Rostov-on-Don, where large-scale vegetable-gardening has been organized.

When fully commissioned, the Don Irrigation System will irrigate 600,000 hectares and water 1,000,000 hectares of land in Rostov Region, while in the southern districts of Stalingrad Region, it will irrigate 150,000 hectares and water 1,000,000 hectares of land.

Reclamation of marshes and reed swamps in the deltas of the Terek and the Kuban has yielded additional farmland in the Northern Caucasus. For a long time nothing was done to utilize the great Kuban reed swamps for farming. However, large-scale reclamation has cleared considerable areas and these have been converted into rice plantations, orchards and vegetable gardens. This work was facilitated through the construction of the Tshchikskoye and Shapsugskoye reservoirs as well as the above-mentioned Nevinnomyssk Canal, which diverts a part of the Kuban waters and reduces the pressure during floods. The Tshchikskoye Reservoir, which is sited in the former Tshchikskoye Reed Swamp in the left-bank floodland of the Kuban, collects the waters of this river and of the Laba and the Belaya, thus making it possible to control the flow in the Kuban at different times of the year. The Shapsugskoye Reservoir regulates the flow in the Afips River.

The building of irrigation systems is continuing. The Right-Yegorlyk, the Terek-Kuma, and the Kuma-Manych canals as well as the Chograi Reservoir will soon be opened. Construction will shortly be started on the Kuban-Kalaus Irrigation System. Work is proceeding on the Krasnodar Reservoir on the Kuban. Reclamation of reed swamps and marshland is continuing in the lower reaches of the Kuban where two irrigation systems are being built.

Forest shelter belts are an important factor contributing towards higher crop yields.

Pines and red willows are being planted in the Terek-Kuma Steppes to fix the sands and cover them with woods. Wild-growing grasses are sown for the same purpose and also in order to improve the pastures. More vineyards are being laid out on the sands. Forest shelter belts will also extend along the new Terek-Kuma Canal and its entire distributive system. Since the Terek-Kuma Canal will pass through territory that is especially subject to dry winds and "black sand-storms," forest shelter belts will be planted on either side of it.

In hilly watersheds and on steep hill-sides, forest belts improve the water regime of the soil.

In the south of the Russian Federation we find the Black Sea. It has been portrayed on many canvases in all its splendour and beauty by the Russian seascapist Ivan Aivazovsky.

Numerous legends reflect historical episodes that are tied up with the Euxine as the Black Sea was called in classical Hellas, with the Sea of the Rus as it is named in Arab chronicles and by Byzantine historians, with the Surozh Sea as it was called by the Muscovites of old.

The coast of the Black Sea has long been famous for its riches, for which reason it was not only the arena of a brisk trade but also of savage wars. The legendary ships of the Argonauts and of Ulysses which voyaged in the Black Sea were soon followed by Greek warships and merchant vessels. The Greeks founded thriving colonies on the eastern shore, but in the 5th century B. C. these colonies were captured by the Romans and began to decline.

The Black Sea was not always confined to its modern borders.

Several million years ago, in a remote geological epoch, southern Europe was the territory of the huge Tethys Sea. Subsequently, the size and contours of this sea changed and in the Middle Tertiary Period it formed an inland semi-fresh water basin called the Sarmatian Sea-Lake. Still later, it contracted considerably and turned into the Miocenic and then the Pontic. As a result of geological transformations in the Earth's crust and the formation of big mountain ranges in the south of Europe, the Pontic Sea separated into the Mediterranean, Black and Caspian seas. Then another upheaval connected the Black Sea with the Mediterranean, joining it to the basin of the Atlantic Ocean.

The Black Sea has its own hydrological features. Beginning at a depth of 150-200 metres thick layers of water are saturated with hydrogen sulphide, a product of the activity of sulphur bacteria inhabiting the bed of the sea. Practically no oxygen reaches down to these levels. Formerly, it was believed that there was no exchange between these levels, and that the nourishing substances from the upper layer go into the bottom layers never to return. As a result, there the impression was that there was poor organic life in the

Black Sea and that even the upper layers were of little value as fishing-grounds. Soviet hydrologists have shown this impression to be wrong. It was shown that the upper, oxygen-filled layers are separated from the lower, hydrogen-sulphide layers by intermediate levels in which water moves in a vertical direction. The fauna of the upper level develops unhindered in water that has a considerable oxygen content. It turned out that far from being poor in nourishing substances and plankton, the Black Sea is richer than even the Mediterranean.

Soviet scientists who studied the Black Sea fauna proved that some fish which formerly were considered rare for this sea are really very widespread. These include sprats, pelamyd and the great tunny. Although the pelamyd and the tunny leave for the Mediterranean in winter, they spawn abundantly in the Black Sea. Sprats are widespread in the open waters of the Black Sea and are the chief food of dolphins. Altogether, there are 170 species of fish in the Black Sea, the best-known of which are the beluga, the sturgeon, the sevryuga, the grey mullet, the khamsa, the horse-mackerel and the Kerch herring. Especially great numbers of fish are caught in the Kerch Straits during the autumn and spring seasons. Dolphins are also an important cetacean for they yield industrial fat.

The Black Sea plays a big role in the economic life of the Russian Federation not only because of its natural wealth but also because it is an important line of communication with other countries. The Black Sea ports receive merchant ships flying the flags of many countries, while Soviet ships carrying oil, grain, ore, timber, machines and many other cargoes leave the Black Sea through the Bosporus and the Dardanelles.

The Black Sea is the warmest of the seas washing the shores of Russia and favourably influences the climate of the south of Russia. The climate is particularly mild along the part of the Caucasian seaboard which is protected against the cold north winds by mountains. The coastline of the Northern Caucasus, which is part of the Russian Federation, extends from the Taman Peninsula to the town of Adler. Farther to the south-east lies the Black Sea coast of Georgia.

South of Tuapse, the North Caucasian seaboard enters the humid subtropical zone, with its warm, mild climate, high precipitation (up

to 1,500 millimetres annually) and frequent torrential rain. The conditions here are conducive for the development of luxuriant warmth-loving vegetation. The sides of the mountains are covered with big virgin beech, oak and hornbeam forests. The yew and the box-tree are likewise not infrequent. There is a state box-tree preservation in Khosta. In the valleys, giant creepers intertwine with the trees, while along the coast there is an abundance of tropical plants like palms, bamboo, eucalypti, bay-trees, magnolias and citruses. The numerous holiday homes and sanatoriums are buried in the verdure of magnificent parks.

The Kerch Straits connect the Black Sea with the Sea of Azov.

The Sea of Azov is the smallest and shallowest of the seas washing Russian shores. Compare its maximum depth of 15 metres with the depth of the Black Sea where in places the bed lies 2,245 metres below the surface. Its waters are strongly diluted by the Don and other rivers so much so that they are four times less saline than the Mediterranean. In summer, these shallow waters grow very warm with the result that organic life has all the conditions for development. For its wealth of flora and fauna, the Sea of Azov is almost unrivalled in the world. It seethes with plankton and benthos. In summer, there is such an abundance of plankton weeds that the sea virtually "blossoms" and the water turns green or green-brown. Plankton is an excellent feed for many species of fish and the Sea of Azov serves as a "pasture" for the Black Sea fish as well.

In the east, the Caucasus and the area north of the Caucasus come down to the Caspian.

The North Caucasus consists of eight economic administrative regions: Rostov Region, Krasnodar and Stavropol territories and the Kabardinian-Balkar, the North Ossetian, the Checheno-Ingush, the Daghestan and the Kalmyk autonomous republics. Stavropol Territory embraces the Karachai-Cherkess Autonomous Republic, while Krasnodar Territory includes the Adygei Autonomous Republic.

In the North Caucasus, heavy industry is the chief branch of the highly developed economy.

North of the Caucasus there is the big north-western coal and metallurgical base within the confines of Rostov Region, which embraces the eastern part of the Donbas, districts of the Lower Don, and

the Azov area. Great deposits of high-calorie anthracite and coking coals lie in the southern part of this basin. In post-war years, geologists investigating the area on the left bank of the Don in Rostov Region discovered rich deposits of anthracite. The North Caucasus yields more than 11 per cent of the Russian Federation's coal. This coal basin's location on railways near river arteries and sea routes allows it to supply coal to many industrial areas.

The proximity of raw materials and fuel (the Krivoi Rog iron ore, Donets coal and Donets fusing limestones) facilitated the establishment of a ferrous metals industry on the Lower Don. There is now a big iron and steel works in Sulin and another at Taganrog. They supply raw materials for numerous metal-working enterprises.

Rostov's Rostselmash, which is the biggest farming-machinery works in the Soviet Union, produces the most intricate types of agricultural machines, including grain combines, self-propelled mowers and maize harvesters. Many kinds of agricultural machines are also produced at the Krasny Aksai Works, which is also in Rostov. Taganrog manufactures self-propelled and electric-powered grain combines. Another of Taganrog's big factories, the Krasny Kotelshchik, produces massive boilers for thermal-power stations. The North Caucasus puts out more than 40 per cent of the steam boilers produced in the Russian Federation.

Transport machine-building is represented by the Novocherkassk Electric Locomotive Works, which now produces the powerful VL-23 electric locomotive that develops an extraordinarily high speed. The substitution of electric locomotives for the less efficient steam engines is one of the major tasks confronting the Soviet railway transport in the next few years. The Krasny Don Works of Rostov makes powerful all-metal self-propelled barges.

Taganrog, Novocherkassk and Stavropol each have machine-tool works, while machinery for the food industry is made in Rostov.

There is a concentration of non-ferrous metals plants (producing zinc and lead) in Northern Ossetia, where polymetallic ores are mined in the Alagir Ravine. Non-ferrous metals are also mined in the mountainous area of Stavropol Territory and in the Kabardinian-Balkar Autonomous Republic.

In contrast to the ferrous metals and large-scale coal industries,

which are mainly in one area, the oil and gas industries are distributed throughout the Northern Caucasus. The reason for this is that there is oil and gas all along the northern slopes of the Caucasian Range from the Black Sea to the Caspian. The chief oil regions of the Northern Caucasus are Grozny, the Kuban-Black Sea area and Daghestan.

One of the oldest oil regions in Russia, Grozny, which embraces a comparatively small territory, has enormous deposits of oil with a high content of benzine and paraffin. Grozny benzine is regarded as one of the best in the U.S.S.R. This area, with its big oil-refineries, pipes oil to Armavir and Makhachkala. This region also has gas wells.

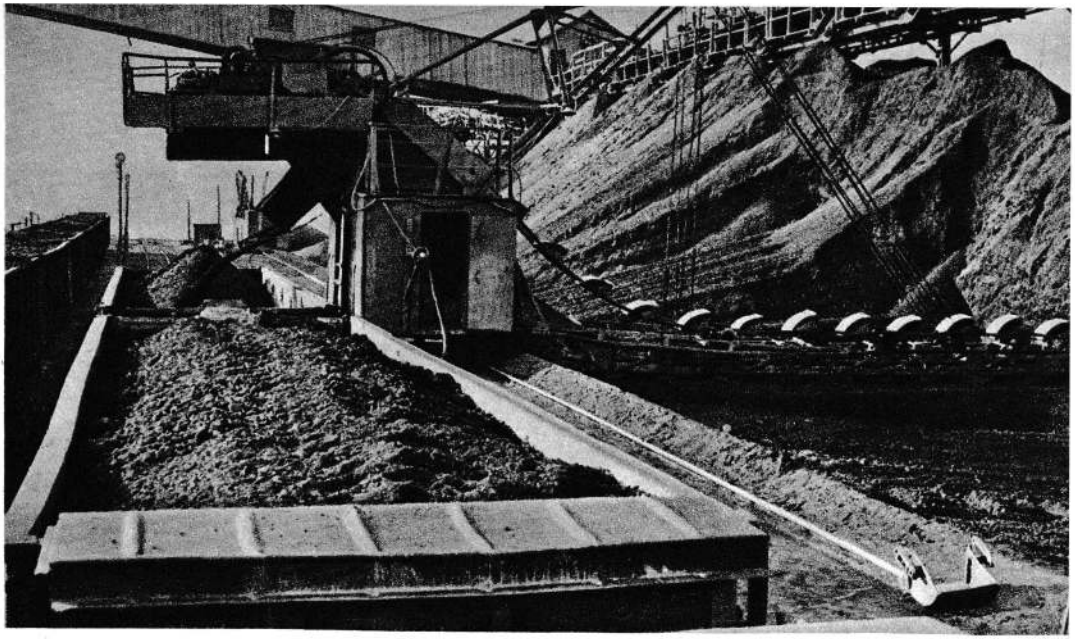
The oil centres of the Kuban are Neftegorsk, Apsheronsk and Khadizhensk. Oil-fields have been discovered throughout the Trans-Kuban, in the Taman Peninsula and in part of the Kuban Lowland. It is planned to step up the oil output of this area by developing the newly-discovered deposits. There are oil-refineries in Krasnodar and Tuapse, which receive their oil by pipe-line.

The oil extracted in Daghestan is sent to Grozny and other oil-refining centres. Extraction of oil from the bed of the Caspian has been organized in recent years.

Exploitation of the huge Stavropol gas deposits has sharply increased the output of natural gas. The Northern Caucasus now produces 20 per cent of the gas in the R.S.F.S.R.

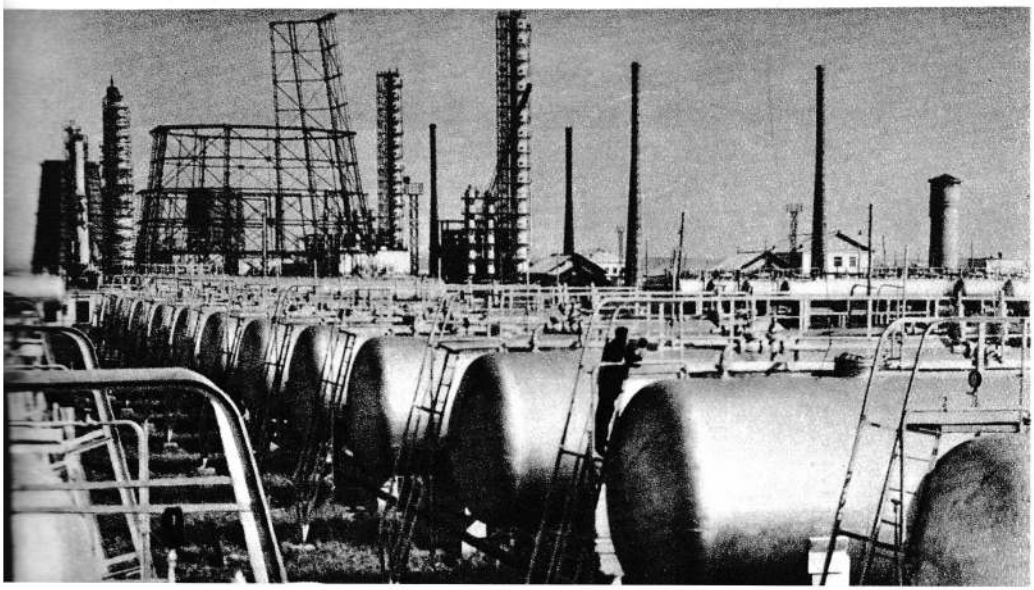
The recently commissioned Stavropol-Moscow gas pipe-line has helped to bring the North Caucasian natural gas to a vast territory. This gas goes to Rostov-on-Don and other industrial centres in the region. Pipes are being laid to carry gas from the Kuban area. In the past few years, prospecting has shown that there is as much gas in the Kuban area as in Stavropol Territory. The increased output of natural gas will cover quite a considerable portion of the power requirements in the North Caucasus.

Greater output of gas will be accompanied by an expansion of the chemical industry, which has far-reaching prospects of development in this region. The production of soot and plastics is being based on the utilization of natural gas. For the first time in its history, Soviet industry will use gas as a raw material for fertilizers. A big nitrogen-



Open-cast mining at the Korkino deposits, Chelyabinsk Region

Tuimazy Gas and Benzine Works in Bashkiria



fertilizer works is already being built in Stavropol Territory. Another important task facing this industry is to organize the output of synthetic alcohol and rubber, solvents, lacquers and other chemical products from oil and natural gases.

In Novorossiisk there is a big cement industry supplying cement to many building projects in the Soviet Union. In Daghestan, a large works produces window-glass and there is a rapidly expanding timber-sawing and wood-working industry which gets its raw material locally.

The tremendous water resources have served as a basis for the construction of hydropower stations. High-tension transmission lines stretch across ravines and mountain slopes, across steppes and foothill plains. Construction of hydropower stations is being combined with the creation of systems of irrigation canals. The already mentioned Tsimlyanskaya Hydropower Station, which was put in operation in 1952, is the biggest in the Northern Caucasus.

There are interesting crafts that have a long history among the mountain peoples—the Kubachi jewelry (Daghestan), the Balkhary artistic pottery, the Untsukul incrustation on wood, the metal crafts of Khrobuk, and the tin works of Kazi-Kumukh. Weaving, which has been raised to the level of art among the mountain-dwellers, is particularly outstanding as a craft. The mountaineers make beautiful, long-wearing carpets, pelisses, felts and felt cloaks made from sheep and goat wool. The craftsmen make their own yarn and dyes.

Nature's gifts in the south of the Russian Federation are fertile soils, a mild climate and lush pastures. Agriculture is making comprehensive use of these gifts. Wheat, maize, rice, sunflowers, kenaf, southern hemp, tobacco, vegetables, fruit, grapes, tea and many other valuable crops are cultivated in this region. Animal husbandry and poultry-farming are producing meat, butter and fine-fleeced wool. This area is an important Soviet food base.

Winter wheat is sown on more than two-thirds of the entire crop area. It is the chief crop along the Lower Don, in the Kuban and in Stavropol Territory. Little spring wheat is sown here because under local soil and climatic conditions each hectare under winter wheat yields 20 per cent more grain than if it were sown to spring wheat.

Maize is an important crop in these parts. Many regions of the Northern Caucasus sow maize in stubble after grain crops. The second crop reaches the stage of milk-cob ripeness and yields more than 800 centners of green mass per hectare. The Northern Caucasus keeps many regions of the U.S.S.R. supplied with maize seeds. Large areas are being sown to maize in the Kuban area where big pig-breeding farms are being established.

Besides wheat and maize, spring barley, buckwheat, oats and millet are sown in the Northern Caucasus, and rye is sown in Rostov Region. Millet is an ancient crop in these parts and is used as bread and for brewing *bouza*, a popular beverage in the mountains. One of the staple crops in the Northern Caucasus, rice is grown on plantations which had been laid out in the reclaimed Kuban reed swamps.

The sunflower is the leading industrial crop in this area. Bast cultures, such as southern hemp and kenaf, are being introduced.

Vine-growing, which is one of the oldest branches of farming in the Northern Caucasus, is being developed. In the Kuban-Black Sea area there are big state vine-growing farms and plants producing champagnes and table wines, including Riesling, Pinot-Chardonet, Pinot-Gris, and white muscat.

Orchards are widespread, particularly in the Kuban area and in Stavropol Territory. In Krasnodar Territory there are big state orchard farms such as the Sad-Gigant with 2,300 hectares of orchards and the Agronom with 1,700 hectares under fruit-trees.

The Black Sea coast of the Northern Caucasus is the only region in the Russian Federation where subtropical plants are grown. These include citrus fruits, tea, the bay-tree, almonds, pomegranates and eucalypti.

A large share of the Russian Federation's livestock is in the Northern Caucasus. When it was decided to overtake the United States of America in per capita meat, milk and butter output within the next few years, the people of the Kuban area chose to compete with the State of Iowa, the chief maize area in the U.S.A. with big cattle and pig-breeding farms. This choice was made because the natural conditions in the Kuban are almost the same as in Iowa. The calculations of the Kuban farmers showed that they can not only

overtake but also surpass Iowa in the output of milk and meat per 100 hectares of farmland. In 1960, the collective and state farms of the Kuban area will fatten more than six million pigs and obtain over 30,000 tons of poultry meat, while by 1961 they will have more than 900,000 cows.

More than two-thirds of the fine-fleeced wool in the Soviet Union come from the Northern Caucasus. The state pedigree sheep farms of Stavropol Territory have evolved new breeds of fine-fleeced sheep such as the Caucasian and the Stavropol. These yield a wool that is fine and elastic and from 8 to 14 centimetres long. The Soviet merino breed, which has been acclimatized to year-round pasturage, has been improved. The other breeds of fine-fleeced and semi-fine-fleeced sheep evolved are the Grozny, the Salsk and the Daghestan Mountain breeds.

The shortage of winter pastures in the mountain districts compels the farms to winter their stock in the Caspian Lowland, in the Nogaiskaya Steppe and the Black Lands. The comparatively warm climate, the low precipitation in the form of snow and the abundance of good grasses make these areas excellent winter pastures for cattle and sheep. The grasses are almost as nourishing as concentrated feeds and a higher wool yield is obtained from the sheep that graze here. Nearly 3,000 shepherds drive huge herds to these winter pastures. The Stavropol farms alone pasture more than a million and a half head of sheep in the Black Lands. In severe frost, the animals are kept in special heated sheep-folds containing an insurance reserve of hay, while water is pumped up from wells. In recent years, farms have begun to sow grain crops to augment the grasses in the winter pastures of the Caspian Lowland.

Poultry-breeding is an advanced branch of farming in the Northern Caucasus, which is famous for its bronze turkeys, chickens, ducks and geese.

Horse-breeding is an ancient occupation in these parts. The Kabardinian and Don breeds of horses, which participate in the races at all race-courses in the country, are particularly valued.

Bee-keeping and silkworm-breeding are steadily developing in the Northern Caucasus (in Stavropol Territory).

Big-scale farming is providing the resources for an expanding in-

dustry processing local farm products: meat, butter, flour, canned food, wine, starch and treacle, and tobacco.

In 1956, the Northern Caucasus took care of a sixth of the meat produced in the R.S.F.S.R., 13 per cent of the butter, almost half of the vegetable oil and nearly 40 per cent of the canned food.

In this area, the most interesting food enterprises, which are at the same time the biggest of their kind in the Russian Federation, are the canning factory at the village of Krymskaya, the butter combine in Krasnodar, the Abrau-Dyurso champagne cellars, the maize plant in Beslan, and the tobacco mill in Rostov. In Krasnodar Territory there are tea factories.

Fish canneries are distributed along the shores of the Black, Azov and Caspian seas. Nearly six per cent of the fish in the R.S.F.S.R. come from the Northern Caucasus.

The beneficial climate of the North-Caucasian Black Sea Coast and its forest-clad mountainous regions, the medicinal properties of the Black Sea and of the mineral springs, the abundance of grapes and the most diverse fruit, and the lovely landscape have made this wonderful territory nationally renowned as a spa. Big, world-famous health resorts have sprung up along the Black Sea coast and in the mineral-waters region. Hundreds of thousands of people annually go there to spend their holidays or to recover their health.

Sochi, the country's biggest and most beautiful health resort, is situated on this coast. Matsesta with its medicinal sulphur springs is situated only a few kilometres away from Sochi and together these two resorts occupy a shore-line of nearly 30 kilometres.

The Sochi District is the warmest in the European part of the R.S.F.S.R. It is on the same parallel as Nice. The bathing season in Sochi lasts for more than 130 days in the year.

If it is approached from the sea, this picturesque town with its parks will be seen to stand on a hilly bank surrounded by wooded mountains coming right up to the shore. On a clear, sunny day the eye is caressed by the soft colours of the green parks and the azure sea. The white buildings of the sanatoriums and holiday homes stand against a dark-green background of cypresses and palms. The Caucasian Riviera, situated right on the beach on the edge of a narrow shore-line, stands out among them. The huge Voroshilov Sanatorium,

which is linked with the sea by a cableway, is on the slope of a hill covered with rich subtropical vegetation. In Sochi, there are nearly 60 holiday homes, and a motor highway, lined with palms, eucalypti and other decorative trees, runs right through the town. The Sochi Dendrarium, a unique museum of subtropical and tropical vegetation, has a big collection of plants from many parts of the world. Particular attention is attracted by a perennial aquatic plant called Victoria Regia which has enormous leaves floating on the surface of the water. These leaves can bear the weight of a child.

There are many lovely places around Sochi with the Agur Waterfalls and Mount Akhun among them. On top of this mountain stands a big watchtower giving a view of the Caucasian Range and of the sea.

The whole of the Black Sea coast is virtually dotted with resorts. The children's resort of Anapa with its splendid sandy beach is another of the Northern Caucasus' famous spas.

The mineral-water spas are farther inland, at the foot of imposing Mount Elbrus. The biggest and most famous of these is Kislovodsk with its *narzan* springs and more than 50 sanatoriums and holiday homes. This resort is situated at an elevation of 820 metres and is protected against winds by the mountains encircling it. Here there is plenty of sunshine, the air is pure and the climate is free from sharp temperature fluctuations, particularly in the winter months. For that reason, the spa functions all year round and is the best place for people suffering from heart diseases.

The other mineral-water resorts—Yessentuki, Pyatigorsk and Zheleznovodsk—are near Kislovodsk.

Mikhail Lermontov was killed in a duel on Mount Mashuk two kilometres away from Pyatigorsk on July 27, 1841. His name is associated with many spots in and around Pyatigorsk and they are described in his *A Hero of Our Time*.

There are quite a few spas east of the mineral-water spas deep in the mountain districts of the Northern Caucasus. The most interesting of these is Teberda, which is situated in a lovely hollow at an elevation of 1,300 metres and is surrounded by coniferous forests and alpine meadows. The climate here is better than at Davos, Switz-

erland. Winds and sharp temperature changes are practically unknown and the summer is cool and the winter mild.

The Northern Caucasus attracts the most tourists and mountain-climbers in the Soviet Union. The stately landscape—the ravines and mountain passes, the huge sheer ice-covered Bezengi Wall, the giant glaciers and the extinct Kazbek and Elbrus volcanoes—is unusually beautiful and varied. Particularly large numbers of tourists travel along the Georgian, Ossetian and Sukhumi military roads which cut across the central and western parts of the Caucasian Mountains.

In the Northern Caucasus the population is very unevenly distributed. There are extremely densely populated regions like the Kuban area, Stavropol Territory and the Lower Don. More than three-quarters of the entire population live in these regions and in some districts the density per square kilometre is over 100. But there are districts which are as sparsely populated as the Extreme North. These are the Caspian semi-deserts and the higher levels of the Caucasian Range where there are not more than five or six persons per square kilometre.

A great many nations live in the Northern Caucasus. During the period of Russian colonization, almost the entire plain north of the Caucasus was settled by Russians and Ukrainians, who make up the largest national contingents in this area. The indigenous Caucasian population lives mainly in the mountains and in the foothills. It would take too long to list all the local nationalities, for there are more than 30 of them in Daghestan alone, which is called "a land of mountains and a mountain of languages." The biggest of the indigenous peoples have received national autonomy in Soviet years.

Prior to the Revolution, many of these peoples did not have a written language, yet today their culture is on a very high level. School textbooks, newspapers and magazines, scientific literature and fiction are published in the languages of the local peoples. National theatres have been established. Illiteracy has been done away with long ago and extensive cultural and educational work is being carried on among the population. Tremendous successes have been scored by Soviet public health in the fight against malaria, goitre and dysentery, which were once very widespread here.

Many of the North-Caucasian towns are similar for their build-

ings, lay-out and other features. This is the result of an identical historical past, for almost all of them sprang up as fortresses and then developed as trading centres. That left its mark for a long time. In contrast to the towns, the villages are extremely dissimilar. There are Cossack *stanitsas* and Ukrainian settlements with populations of 10,000 people, and tiny mountain auls nestling in ravines and on mountain sides. The latter bear no resemblance to conventional villages. For example, in mountainous Daghestan, the auls are situated in the form of an amphitheatre, so that the roof of one dwelling serves as the courtyard of another.

The urban population of the Northern Caucasus has trebled compared with pre-revolutionary times.

The towns have changed beyond recognition thanks to the economic and cultural progress.

Rostov-on-Don with its 597,000 inhabitants is the loveliest of the cities in the south of Russia. Its broad, straight streets are bordered on either side by branchy maples, acacias and lindens which absorb the burning rays of the southern sun in summer. The many gardens, parks and boulevards with their countless flowers give the city its colour.

A big industrial centre and a port, Rostov's importance increased when the Lenin Volga-Don Canal was opened. Linking up all the seas of the European part of the R.S.F.S.R. into a single water transport system, the canal affords a through two-way water passage for freight. Comfortable diesel ships carry passengers along the Moscow-Rostov and other lines.

As a cultural centre, Rostov has seven institutions of higher learning, including a university, and more than 40 research establishments.

Taganrog, the second biggest and important town in Rostov Region, has 200,000 residents. It is a port on the Sea of Azov and an industrial centre. This town is especially dear to Soviet people as the birth-place of Anton Chekhov.

Novocherkassk, the town of higher schools, is situated near Rostov. With a population of 90,000 people, it has five institutions of higher learning and nine secondary special educational establishments.

The town of Shakhty (formerly Alexandrov-Grushevsky) arose on the site of a *stanitsa* located on the Grushevka, a small steppe river.

In the late 19th century, this *stanitsa* became the centre of a coal region. The modern town of Shakhty is an important industrial centre with many big buildings, tree-lined streets and squares. The surrounding landscape, consisting of workers' settlements, collieries, waste-mounds and side-tracks, makes it look different from the neighbouring Cossack *stanitsas*.

There are many other industrial towns on the Lower Don, including Kamensk-Shakhtinsky, Millerovo, Chertkovo, and Krasny Sulin. The biggest towns in the Trans-Don Area are Bataisk, Azov (in the mouth of the Don), Salsk and the newly-built Zernovoi. The fertile Kuban-Azov Plain encompassing Krasnodar Territory extends to the south of Zernovoi.

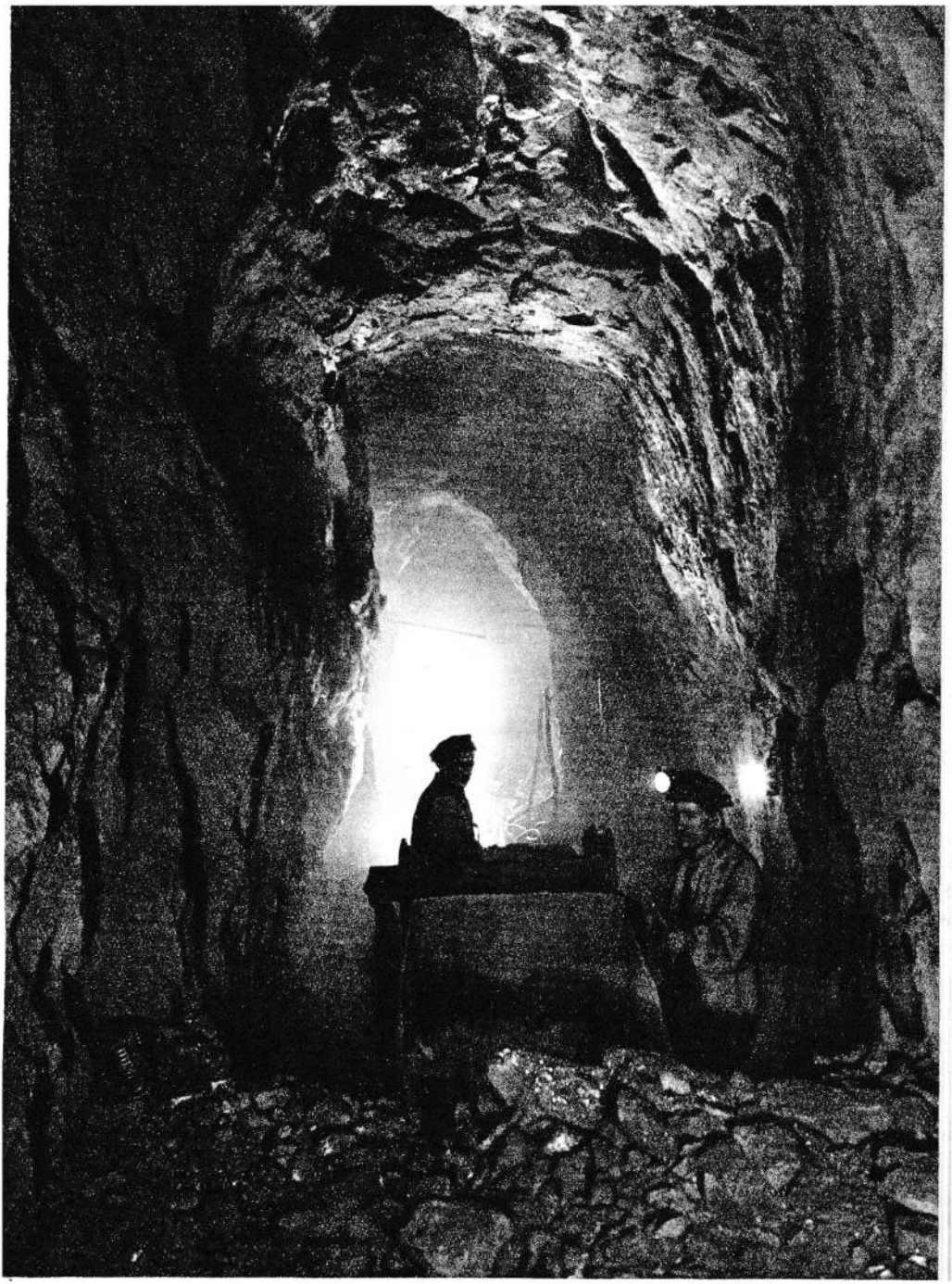
Krasnodar Territory's convenient geographical location on the junction of the Black and Azov seas close to the Donbas and other economically advanced regions has been largely responsible for the development of its natural resources and the growth of industrial centres, the biggest of which are Krasnodar, Armavir, Novorossiisk and Tuapse. The chief city of the territory, Krasnodar, with a population of 312,000 people, is situated amidst verdure in the southern part of the Kuban-Azov Plain, on the deep and fast Kuban River.

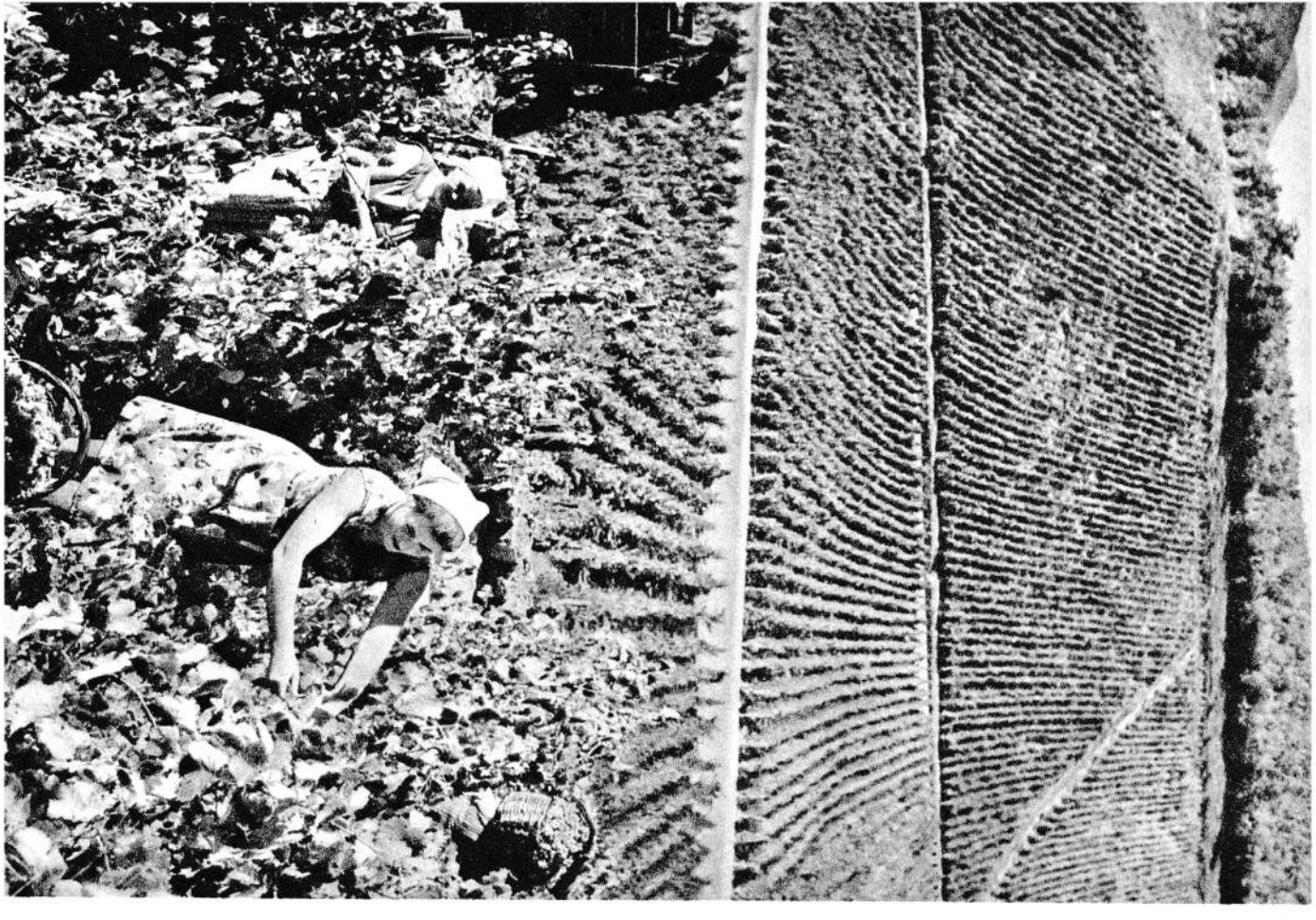
The Cossacks who came to the Kuban from Zaporozhye set up their headquarters on this site in the late 18th century and called it Yekaterinodarsky. Subsequently, this Cossack centre developed into the town of Yekaterinodar as a result of increased shipping along the Kuban River and the building in the late 19th century of a railway from Tikhoretskaya to Novorossiisk, which gave the rich Kuban farming area an outlet for its products to the industrial centres of Russia and to the Black Sea.

Once predominantly a merchant town, Krasnodar has become one of the biggest cities of the Northern Caucasus and an important centre of the engineering and oil-refining industries. A township of oilmen has grown up in its northern part. The city also has several big enterprises of the food and light industries.

Formerly, there was not a single institution of higher learning in the city, but now there are four.

The Black Sea town and port of Novorossiisk sprawls on the Black Sea coast, on the shore of Tsemes Bay. This closed bay affords a shel-





Abrau-Dyurso vineyards, Krasnodar Territory

ter for ships in all weather. Novorossiisk is one of the major ports of the Black Sea and deals chiefly in oil, cement and grain. The town's economic life seethes with activity. It has cement works, a big refrigerator plant and other enterprises.

When we speak of Novorossiisk, we cannot help but mention the savage north-easterly wind that frequently blows in this area. In winter, when the temperature drops to 20°C. below zero and this wind attains the intensity of a hurricane the bay freezes over and ice forms on the ships. The wind sometimes causes enormous damage to the town and the port, even to the extent of derailing trains.

The port of Tuapse, which is known for its oil-refineries, is situated to the south-east of Novorossiisk. From there oil products are sent all over the country by sea and by rail.

At the source of the Tashla River in the western part of the Stavropol Upland stands Stavropol, the territorial centre and the largest town in the foothills of the Caucasus. It has 148,000 residents.

An attractive panorama of straight, well laid-out streets lined by ancient oaks and poplars opens from the surrounding hills. Endless fields sown to wheat, sunflowers and maize surround the town. Flocks of fine-fleeced sheep graze in the extensive meadows.

Stavropol sprang up on the site of one of the fortresses built at the close of the 18th century along a defensive line passing from the Sea of Azov to Mozdok and serving to safeguard the southern borders of Russia. Stavropol soon became the seat of the Caucasian vicegerency and then the chief town of a province. However, as it was situated far from the main railways and trade routes its development was slow.

Even though the city still lies far from the trunk railway of the Northern Caucasus, the Rostov-Baku line, it has nevertheless made great economic progress. It is the centre of an important grain and vegetable region and has quite a few enterprises processing farming produce. A large seat of culture in the Northern Caucasus, Stavropol has four institutions of higher learning and several research establishments, including the Institute of Sheep- and Goat-Breeding, which is helping to evolve new breeds of fine-fleeced sheep and, among other problems of animal husbandry, is studying how pastures could be used most effectively.

The oil town of Grozny is in the eastern part of the foothill zone. Soviet years witnessed the construction there of a large-scale oil industry, engineering plants, the Grozny-Armavir and the Grozny-Makhachkala pipe-lines, and a big thermal-power station. An oil institute is functioning in the town.

The fortress of Grozny was founded in 1818. A memorial to its founder General Alexei Yermolov, who was then the commander-in-chief of the Russian army in the Caucasus, stands in the Prospekt of the Revolution to this day. Yermolov's dug-out was the first dwelling in the fortress. In the first five months while Grozny was being built, this dug-out was the administrative centre of the entire Caucasus. The writer Alexander Griboyedov was a frequent visitor in the fortress, while Mikhail Lermontov served in the Tenginsky Infantry Regiment which was stationed there. Lev Tolstoi fought in the battles around Grozny.

West of Grozny lies the town of Nalchik, capital of the Kabardinian-Balkar Autonomous Republic. Wooded hills that give way to tall mountains come right down to the town from the south. The snow-capped peaks of the Great Caucasian Range can be seen from the town on a clear day. Nalchik is a national seat of mountain-climbing and tourism. The routes to the tallest Caucasian peaks start from it. An adornment of the town, a splendid park, stretches for nearly three kilometres to the holiday resort of Dolinsk, where sanatoriums and holiday homes are situated among orchards. In the park, there are more than 70 species of exotic plants, including the beautiful, silvery-blue fir. Nalchik sends decorative plants to parks in different parts of the Soviet Union.

Orjonikidze, capital of the North Ossetian Autonomous Republic, is crossed by the swift Terek River which flows from the Daryal Ravine. The river roars its way through the city, the waters hurtling over the piles of rocks. In clear weather, the park on the banks of the Terek gives a fine view of the Great Caucasian Mountains. Mount Stolovaya and the dazzling snow-white cap on Mount Kazbek can be seen distinctly from the town. Orjonikidze's proximity to the glaciers of Mount Kazbek is the cause of the sharp temperature fluctuations that are observed in it.

A large industrial centre, Orjonikidze has 160,000 residents. There are many schools (including five institutions of higher learning) and other cultural establishments. This town is the starting point of the Georgian Military Road.

Makhachkala, capital of the Daghestan Autonomous Republic, stands on the shore of the Caspian. From the port district, its streets rise into the mountains in parallel lines.

Sea lanes connect Makhachkala with Baku, Astrakhan and other ports on the Caspian. At the same time, Makhachkala is a leading industrial and cultural centre. It has a branch of the U.S.S.R. Academy of Science, five institutions of higher learning and several technical schools.

One of the oldest towns of the Russian Federation, Derbent, whose history traces back to the 5th century, occupies a narrow coastal strip in the southern part of Daghestan. On the west it is bounded by mountains and on the east, by the Caspian. In ancient times, thanks to its strategical position on the routes from Europe to the Middle East, Derbent was an important town. It was an almost inaccessible fortress blocking the narrow passage between the mountains and the sea. That gave it its name (*der*—door; *bent*—lock, barrier). The walls of the fortress, the *kurgans* (grave-mounds) and the ancient cemeteries survive to this day and are reminders of the sanguinary wars that were waged here in the course of many centuries.

Present-day Derbent has many new streets and modern buildings. A beautiful square has been laid out in the heart of the town, which is surrounded by vineyards supplying raw material to its wine-making and cognac plants. A canning factory is one of the biggest enterprises there. Derbent's Dagyun Textile Mill produces yarn for the textile industries in the republic. This mill also supplies yarn for the carpet-makers of Daghestan, the Transcaucasus and Central Asia.

WHERE EUROPE AND ASIA MEET

Lying on the 60th meridian, the Ural Mountains form a line nearly 2,500 kilometres long from the Arctic Ocean to the torrid steppes of Kazakhstan and are a natural frontier between Europe and Asia.

To the west of them is the Great Russian Plain, while to the east—the West-Siberian Lowland.

An ancient mountain range, it has gone through many stages of weathering in the course of millions of years. Water and wind, heat and cold have all left their mark on the mountains. Streams have deepened the valleys, broken down the surface of the range and given it its present rugged relief.

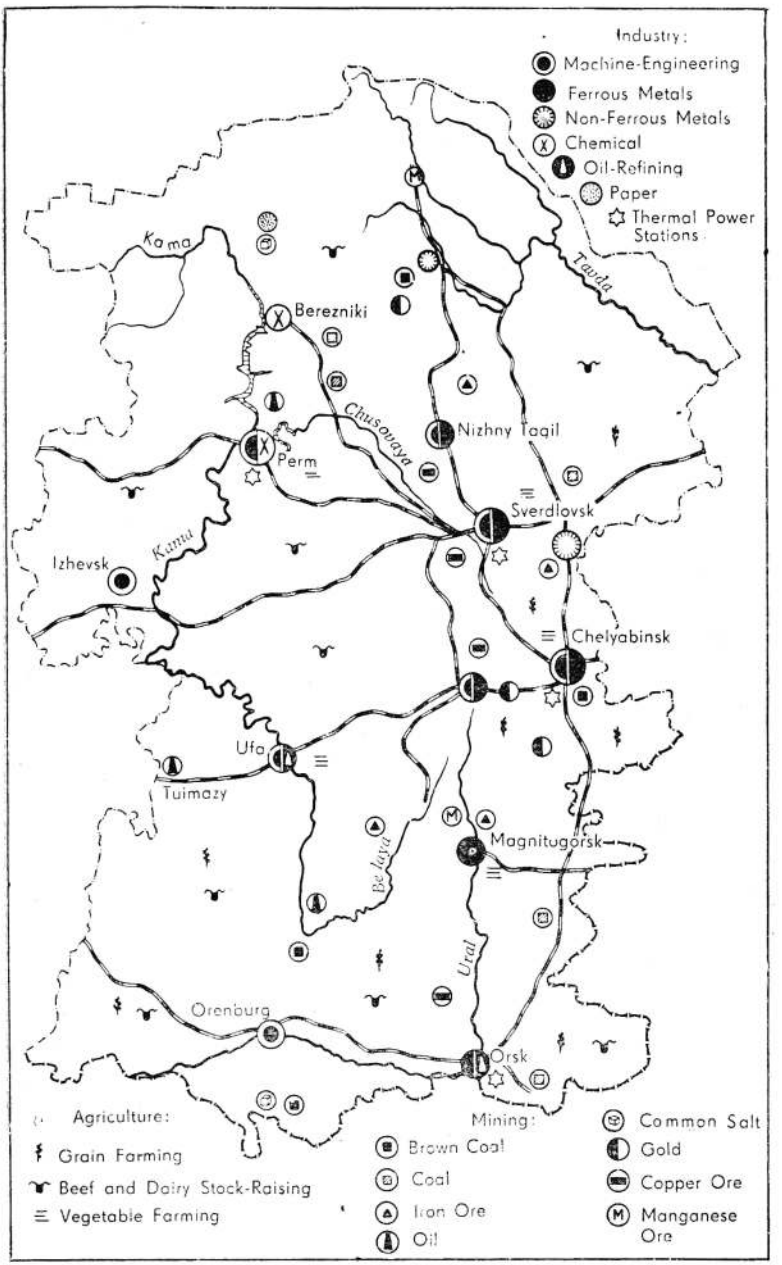
There is a stern northern beauty about these mountains which is at once imposing and calm. At the same time they have many of the features of the usual Central Russian landscape. A visitor approaching them naturally feels a change in the relief but he does not see the sharp change that strikes him when he approaches the mountains of the Crimea or the Caucasus. He finds the same trees and flowers, the same types of villages, and the same pale sky as in Central Russia.

The Urals Range is not high. It does not reach the snow-line anywhere, its highest point, Mount Narodnaya in the Issledovatelsky Ridge, rising to an elevation of 1,894 metres. Higher in the north and the south, this range comes down to 400-500 metres along its centre, where it is the narrowest. The Middle Urals are a kind of natural gate between Europe and Asia. Three of the six railways crossing the Ural Mountains pass through this part of the range. The southern part of the Middle Urals in the region of the city of Sverdlovsk has suffered the most from erosion. The railway running westward from Sverdlovsk crosses the mountains at an elevation of 410 metres and the passenger, without noticing it, goes over the highest point of the pass. A post with a sign *Europe-Asia* is all that tells him that he has left one part of the world and entered another.

One of the railways linking up the European network of railroads with the Trans-Siberian Railway passes through the towns of Ufa, Zlatoust and Chelyabinsk. In the Urals, this railway winds between tall mountains cut up by valleys and deep ravines.

Here is a description of it by the writer Nikolai Garin-Mikhailovsky: "The train twists like a snake and from the top of the precipices you get a view of the endless valleys of the Belaya, the Ufa, the Sima and the Yurezan with a panorama of the wooded, eternally green mountains of the Urals enveloped in a blue haze. There is peace and silence

THE URALS


Industry:
Machine-Engineering
Ferrous Metals
Non-Ferrous Metals
Chemical
Oil-Refining
Paper
Thermal Power Stations
Kama
Tavda
Berezniki
Chusovaya
Nizhny Tagil
Perm
Sverdlovsk
Kama
Izhevsk
Chelyabinsk
Ufa
Tuimazy
Magnitugorsk
Belaya
Ural
Orenburg
Orsk
Agriculture:
Grain Farming
Beef and Dairy Stock-Raising
Vegetable Farming
Mining:
Brown Coal
Coal
Iron Ore
Oil
Common Salt
Gold
Copper Ore
Manganese Ore

in these haze-enveloped, soul-stirring, enthralling spaces.... The grey cliffs hang over an abyss like the rare teeth of a hag and the railway along the Yurezan seems to have been glued to the mountains. And there, between the blue mountains, an eagle reigns, soaring in the sky.... Rumbling, the train speeds past giant, eternally hushed embankments standing mysteriously like sphinxes, past hollows that are as dark as wells, past bridges and branch lines. Stone and cement-bound rivers have resigned themselves, no longer tearing and straining but only weeping silently over their lost freedom...."

There is incalculable natural wealth in this region.

Tectonic upheavals have brought deep-lying paleozoic rocks to the surface and laid bare the riches of the Urals.

For their abundance and diversity of minerals, the Urals are one of the unique areas in the world.

Oil, potassium salts, limestones and gypsum lie in the gently sloping western sides of these mountains.

Minerals are especially plentiful in the steep eastern slopes. They can be reached easily and mined by open-cast methods because the deposits run close to the surface. Iron, chromium, manganese, nickel, copper, zinc, platinum, gold and precious stones are mined here.

The Urals are world-famous for their rare and precious stones—emeralds, amethysts, topazes, jaspers, malachites, rock crystal, sapphires, garnets, tourmalines and aquamarines. Fluor-spar, amazonite, zircon, albite and cryolite also occur. An abundance of semi-precious stones is found especially in the Ilmenskiye Mountains. These mountains have been turned into a preservation where not only the minerals but also the flora and fauna are safeguarded. This preservation has more than 150 mines yielding up to 120 kinds of minerals. Here is what Academician Alexander Fersman, who was one of the leading experts on the Urals, wrote about this preservation: "I have frequently visited these remarkable mines and each time I made a point of going to the Strizhov aquamarine, topaz and cryolite mines. Never has my eye been caught by anything more beautiful. I have seen many deposits of semi-precious stones in the sunny south of the Island of Elba, in the veins of frowning Sweden, in the Altai Mountains, in the Trans-Baikal area, in Mongolia and in the Sayan Mountains, but never have I faced such wealth and splendour as in the amazonite

mines of the Ilmenskiye Mountains. I could not tear myself away from the heaps of greenish-blue amazonite."

The Urals semi-precious stones are ground, polished and sometimes set in gold before they are sent to all parts of the country or exported abroad.

The valley of the Miass River has long been famous as a gold-field. The gold is washed out of the sand. Nuggets occur now and then. This field also has rich veins.

The Urals yield great quantities of iron ore, which frequently contains admixtures of rare metals that are needed for the production of alloy steels. Iron ore is mined throughout the whole of the range and little wonder the Urals are called an "iron belt." As Dmitry Mendeleyev so aptly put it, the Urals lie on a "bed" of ore.

In the Urals, ore-mining was started more than three hundred years ago. Metal-smelting factories using wood fuel were built here early in the 18th century. Soon this became the chief metallurgical region of old Russia. Iron was exported to many West-European countries, including England. In the mid-19th century, the Urals produced more than two-thirds of Russia's pig iron.

Many of the minerals now worked in the Urals were discovered only in Soviet years and among them we have oil, bauxite, potassium and magnesium.

The Urals Range falls into three parts: North, Middle and South.

Part of the North Urals, which is within the Arctic Circle, has features all its own. During the Quaternary Period, the polar section of the Urals lay under glaciers which left their imprint on the landscape. Here Nature is stern and gloomy. Frosts bind the soil to such a depth that only the surface layers thaw out in the summer. Moss and lichens are the chief plants of this mountain tundra.

Below the 67th parallel, the Urals are covered with dense forests consisting of silver fir, spruce, larch, pine and, here and there, cedar. In the Middle Urals, the coniferous forests mix with birches and asps, while broad-leafed trees predominate in the South Urals. Timber is one of the natural riches of this region. It is worked at numerous mills, rafted down river and transported by rail to other regions.

The Urals forests are alive with fur-bearing animals, especially martens and squirrels. At one time there were great numbers of

sable, but extermination of these animals went on for centuries and it was only in Soviet times that measures were taken to preserve them.

The Urals Range serves as a watershed between the European and Asian parts of Russia. The rivers flowing down the western slope belong to the basin of the Caspian, and down the eastern slope—to the basin of the Arctic Ocean.

The most important river of the western slope is the Kama, a tributary of the Volga. Its chief tributaries are the Belaya, the Chusovaya, the Kosva and the Vishera. The deep fairway, the width of the channel and the absence of sandbanks and shoals make the Kama convenient for navigation. Before there was a railway, this river was the chief means of communication between European Russia and the Urals. In ancient times it was part of the trade route from India to Perm and to the mouth of the Northern Dvina. Long before the Tatar invasion, the merchants of Novgorod used the Kama as a means of intercourse with the Urals and Siberia, where they were lured by the unbounded wealth of fur. Although there is now a dense network of railways in the Urals, the Kama has retained its importance as a cheap and convenient waterway linking up the towns of the Urals with the central regions of Russia. It is plied by big caravans of barges carrying metal, ores, oil, chemical products and grain.

Comfortable diesel ships now carry passengers along the Kama, the Belaya and the Chusovaya. A trip along these Urals rivers is extremely interesting because of the picturesque banks and the numerous historical monuments on the way.

The Chusovaya makes an indelible impression on the traveller. Turbulently forcing its way through sedimentary rocks, it allows the traveller to see a multitude of exposed layers of sandstones, shale clays, and limestones interspersed with dolomite veins. These make a beautiful picture with nests of ore dotting the cracks and fractures. Iron, gold, platinum and oil have been discovered along this river. Queerly-shaped naked boulders alternate with sections covered with thick woods. These boulders, or stones as they are called locally, frequently bear the names of the objects they resemble: "Stove," "Giant," "Crests," "Robbers," "Sentry." A group of these boulders, called "Okhonya's Eyebrows," do indeed resemble dark eyebrows when they

are looked at from the opposite bank. Some of the boulders rise steeply as though they were the colossal walls of a mediaeval town. These "walls" are sometimes several kilometres long.

In the region of the city of Sverdlovsk, the upper reaches of the Chusovaya come close to the upper reaches of one of the eastern rivers, the Iset, a tributary of the Tobol. These two rivers have now been joined by a dam.

Besides the Iset, the other important rivers of the eastern slope are the Tavda and the Tura.

The Belaya is the major river of the South Urals. These mountains are also the source of the Ural River, which is the main waterway of Chelyabinsk and Orenburg regions.

The Urals, particularly the eastern slope, are studded with lakes, of which there are more than 200 between Chelyabinsk and Sverdlovsk. The rivers and lakes teem with fish.

The great natural wealth stimulated rapid industrial development in the Urals. The present-day Urals are one of the leading industrial regions of Soviet Russia with a big heavy industry—mining, metallurgical, engineering and chemical. In the Urals, output is greater than that of the entire industry of Russia in 1913.

The Urals have almost overtaken Britain in the output of pig iron, yielding 71 per cent of all the pig iron smelted in the R.S.F.S.R. This area produces 61 per cent of the Russian Federation's steel and rolled ferrous metals and nearly 80 per cent of its iron ore.

Urals metallurgy is using the tremendous local reserves of iron ore (the Magnitogorsk, Khalilovo, Bakal and mounts Vysokaya, Blagodat, and other deposits). However, the Urals lack coal and for that reason coking coals are brought here from the Kuznetsk (Western Siberia) and the Karaganda (Kazakhstan) basins.

The Kuznetsk Basin, or the Kuzbas as it is known, and the Urals are supplementing each other. Giant factories depending on Siberian coal and Urals ore and producing high-grade pig iron, steel and rolled stock have sprung up at either end of the Urals-Kuzbas Railway. Together, the factories of Magnitogorsk, Nizhny Tagil and Stalinsk form the Urals-Kuznetsk Combine. The organization of this combine is a brilliant example of economic planning on a nation-wide scale. In addition to ferrous metals and coal, the Urals-Kuznetsk Combine

produces non-ferrous metals. The factories get their electric power from the large power stations, which are part of the combine.

Many of the Urals factories which formerly put out ordinary metal have gone over to the production of high-grade steel and today the Urals is one of Russia's biggest producers of high-grade metal.

In addition to the large iron and steel enterprises of the Urals-Kuznetsk Combine, the factories of Magnitogorsk and Novy Tagil, there are other metallurgical giants in this area, the Chelyabinsk Works, for example. A great deal of metal is also yielded by the old reconstructed factories in Chusovoi, Zlatoust and other towns. These are the only enterprises in the Soviet Union smelting pig iron with charcoal, which gives the metal special, valuable properties.

Non-ferrous metallurgy has expanded considerably in the Urals in Soviet years. The discovery of big deposits of copper ore has led to the construction of several copper-smelting factories to augment the old, reconstructed enterprises.

Many of the non-ferrous metals, whose extraction and processing now occupies a prominent place in the Urals industry, were foreign to this area prior to the Revolution. These include zinc, nickel, chromium, magnesium and rare metals. A special place is held by bauxites, which are a raw material for the production of aluminium.

A highly developed chemical industry has been built up in the Urals on mineral raw materials and on the waste of various industries. The big Berezniki chemical combine is nationally famous. Mineral fertilizers are produced in Perm and Solikamsk. A large soda works has been built in Bashkiria. The country's first timber hydrolysis plants have been commissioned in the Urals, which are now an all-Union supplier of pyrite for the production of sulphuric acid.

The Urals are one of the most important centres of the Soviet engineering industry.

Prominent among the numerous heavy machine-building plants are the Uralmash and Uralelektroapparat Works in Sverdlovsk, the Tractor Works in Chelyabinsk and the Carriage-Building Works in Nizhny Tagil.

One of the most heavily wooded regions in the country, the Urals have a large timber and wood-working industry, which is concentrated primarily in Perm Region, Bashkiria and Udmurtia. The paper

and cellulose and the timber chemical industries are making rapid headway.

Another important Urals industry is the production of building materials, which is based on the rich resources for the output of cement and brick, as well as refractory materials and facing stones. Factories in Chelyabinsk, Zlatoust and Kyshtim have started the production of abrasive materials to meet the growing requirements of the engineering industry.

Large meat plants were built in the Urals in Soviet years. The Urals first sugar-refinery was built in Bashkiria. Big textile mills have appeared in Ufa and in Chelyabinsk in the post-war years. In spite of this, the local food and light industries fall far short of satisfying the needs of the population and for that reason the 20th Congress of the C.P.S.U. adopted a decision to accelerate the development of these industries.

In the Urals, industry expanded at an unprecedented rate, especially during the Second World War and the post-war years. That required power resources that could keep pace with this industrial expansion. However, the fuel pattern of the Urals is still on the deficit side and although no small measure of success has been achieved in setting up a local power base, the Urals factories have to operate, as we have already pointed out, primarily on coal from the distant Kuznetsk and Karaganda basins.

Nearly half of this region's coal reserves are in the Kizel Basin. There are deposits of anthracite, but brown coal predominates in the Urals. It is mined around Chelyabinsk, Bogoslovsky and in Bashkiria. Neither the size of the deposits nor the quality of the coal allows it to be regarded as the basic source of power for such a huge industrial region.

The case is different with oil. It was first discovered in the Urals (Perm Region) in 1929. Since then extensive prospecting has revealed many other deposits, the biggest of which are in Bashkiria. This formed the main link of the Second Baku.

Hundreds of Devonian gushers have been spouting oil for years in the Bashkirian fields. Well No. 100 began shooting a fountain of Devonian oil into the low-hanging autumn sky more than 12 years ago and since then the black fountain has been roaring without stop. This

well alone has yielded more than half a million tons of liquid fuel. Well No. 100 is by no means an exception. There are many others like it. Such prolonged and generous discharging is new to the history of the oil industry, but it is no accident or a whim of nature. It is the result of large-scale application of methods of artificially sustaining pressure in the oil layers. The basic method is to pump water into the layer, which has become a widespread practice in the Bashkirian oil-fields, thanks to which Bashkirian oil is the cheapest in the country and the output is increasing rapidly.

Large quantities of the oil and oil-products are used locally and also sent to other regions. The Tuimazy-Omsk pipe-line is in operation and soon another line piping oil in the same direction will be opened. The super-long Tuimazy-Irkutsk pipe-line, which is now under construction, will play a major role in the national economy. Construction is under way on three sections. All the oil needed by Siberia will flow along this pipe, which will transport this product 6-7 times cheaper than the railway.

Simultaneously with oil, the Urals are producing gas in a ratio of 5-6:100 as compared with oil. There also are deposits of natural gas, the biggest of which are at Buguruslan in Orenburg Region. From there the oil is piped to Kuibyshev along a line laid during the war.

Another of the Urals' power resources is the two million hectares of peatbogs, but so far only modest use is made of them.

Many thermal-power stations operating on local coal have been built in the Urals.

This mountainous region's hydropower resources are estimated at 4.5 million kilowatts. The Kama, flowing down the Verkhne-Kama Upland, is the major source of this energy. Along its middle reaches, the river carries as much water as the Dnieper, while at its mouth the flow is almost three times greater. The largest of the Urals hydropower stations have been built on this river and bigger ones, like the 900,000-kilowatt Nizhne-Kama station, are planned.

The transport problem is of great importance in the Urals. The long distance to the Centre, the great length from the north to the south and the steadily increasing industrial output is making tremendous demands on the transport system.

Prior to the Revolution, railways crossed the Urals almost exclusively in the latitudinal direction, linking them up with Siberia and the European part of the country. These latitudinal railways continue to play a big role. Other lines have been added to them and at present the Urals have several railway outlets to the east and the west. At the same time, meridional railways, following the line of mountains, were built after the Revolution. Many of the Urals railways have been electrified.

Not only are the Urals a highly developed industrial region, but they are also a major farming area putting out a surplus of grain and other farm products. Compared with 1913, the crop area increased by 50 per cent by 1956 and covered 17 million hectares of land. Almost three-quarters of this land is sown to grain crops, mostly spring wheat. Large areas of virgin and disused land have been ploughed up in recent years.

The internal economic administrative regions of the Urals are Sverdlovsk, Perm, Chelyabinsk and Orenburg regions and the Bashkirian and Udmurt autonomous republics. Perm Region includes the Komi-Permyak National District.

It must be borne in mind that as an economic region the borders of the Urals do not coincide with their physical geographical borders. For example, the Arctic and sub-Arctic parts of the Urals Range do not belong to the Urals economic region. The western slopes enter the Komi Autonomous Republic, while the eastern slopes penetrate into Tyumen Region, Western Siberia.

Sverdlovsk Region is in every respect the most important district of the Urals, holding first place for the wealth and diversity of minerals and other natural resources. It is the Urals' most developed industrial region with a strongly predominant heavy industry.

The chief town of the region and of the entire Urals is Sverdlovsk, which has a population of over 770,000 people.

To use a neat expression of Dmitry Mamin-Sibiryak's, the Urals writer and patriot, Sverdlovsk (formerly Yekaterinburg) was "born with a silver spoon in its mouth," so convenient is its location. The city stands in the very heart of the mineral wealth and industry of the Urals and is at the same time close to the farming areas of the Trans-Urals.

The city's "godfathers" were exceptional men of their day: Vasily Tatishchev, a captain of artillery who later became a noted historian, and Georg Wilhelm Gennin, who was an eminent engineer and an indefatigable builder. The former laid the foundation for the town in 1721 and the latter built it in the course of 1723-24. At first there was only a metallurgical factory, but subsequently the town became the administrative centre of the Urals mining industry. Soon a mint and a lapidary works were built. The discovery of a gold vein near Yekaterinburg laid the beginning for a new branch of the mining industry. After the Siberian Highway reached Yekaterinburg, the town developed into an important trading centre. Expansion proceeded rapidly when the Siberian gold-fields were discovered in 1830-40. Much of the gold from these fields flowed into Yekaterinburg.

Iron, copper, gold, precious stones and the grain of the Trans-Urals and Western Siberia formed the material basis promoting steady development in Yekaterinburg.

Modern Sverdlovsk in the "Moscow of the Urals," the capital of this region. As a matter of fact, the whole rhythm of the life and external appearance of this city bears the stamp of a metropolitan.

The city is situated in the gently sloping valley of the Iset River. A railway runs three-quarters round it, marking the former perimeter beyond which forests once grew. In Soviet years, large-scale development was started in the numerous vacant lots, chiefly in the splendid pine woods beyond the railway.

New workers' and students' settlements have appeared round the city. In the west, by a dam and a large lake, there is the township of the Verkhne-Iset Works. This works sprang up in the 18th century, soon after Yekaterinburg, and has a similarly rich history. A settlement with a medical institute in its centre is situated where the factory township and the old city meet. A panorama of Sverdlovsk and its suburbs opens from here. The straight, always busy Lenin Street, the main thoroughfare of the city with its fine buildings, descends imperceptibly for several kilometres. Passing the Old Pond in the centre of the city, this street rises, again imperceptibly, reaching the railway and approaching the township of higher educational establishments which is situated in a lovely pine wood. Here we find the Industrial and Timber Chemistry institutes, the big research estab-

lishments, and the great buildings housing the teachers' flats and the students' hostels.

The Uralmash Works, built in the period of the first five-year plans, occupies a large territory on the northern side of the city. One of the biggest engineering enterprises in the world, this works puts out drag-lines, rolling-mills, well-boring installations and other equipment for the oil and metallurgical industries. The machinery for many of the blast-furnaces in the Soviet Union came from this works, which fits out factories not only in the Soviet Union itself but also in European and Asian countries. No wonder it is called the "father of factories."

A settlement is situated in a semi-circle round this works in a pine wood. In this settlement there are different kinds of buildings, beginning with pre-fabricated double-storeyed houses that are already dark with age, witnesses of the days when the works was built, and ending with numerous handsome apartment houses that have been erected in the past few years.

A neighbour of the Uralmash, the large Elektroapparat Factory is also situated in a pine wood. There are many other engineering plants in the city.

One of the major cultural centres of the Soviet Union, Sverdlovsk has a branch of the U.S.S.R. Academy of Science with 20 research establishments, and 11 institutions of higher learning headed by a university and polytechnical institute. Moreover, there are a central public library with more than 300,000 books, and three theatres.

Trains arrive in Sverdlovsk from seven directions, while air lines connect it with Moscow, with the cities of Siberia and many other centres throughout the country.

The Tagil mining district is in the heart of Sverdlovsk Region. This is the cradle of the Urals metallurgical industry and together with it of Russia's mining industry. The first Urals factories were built here —in Nevyansk (1699) and in Tagil (1722). Today, the importance of this district reaches far beyond the Urals.

Tagil District occupies the eastern slopes of the Ural Mountains. In this district, these mountains have to all intents and purposes been almost completely eroded: their mean elevation does not exceed 300-400 metres. The broad and almost flat river valleys are obstructed by

short canyons only where the rivers break through crystalline rock. The forests here are not very dense, forming an uninterrupted mass only in the extreme western part of the district. Farther east, they alternate with farmland and meadows, with extensive mining areas and big factory storage lakes stretching for many kilometres.

For its wealth and variety of minerals, this district is perhaps the richest in the Urals.

North of Tagil there is a town called Kushva in a mountain locality thickly overgrown with coniferous trees. Two hundred years ago, Stepan Chumpin, a Mansi, guided Russian miners to a large deposit of magnetic iron in a mountain which was then and there named Blagodat (Blessing). A few years later, the Kushva metallurgical factory was built near this mountain. Today, this factory receives its ore from the mountain by a cableway. Ore from Mount Blagodat now goes to factories in Serov, Novy Tagil, Chusovoi and many other towns. A large concentrating and agglomerating factory has been built close to the mines.

Prior to the Revolution, nine metallurgical factories operated in Tagil District on local iron ore. Now these factories process metal. For example, the Nevyansk factory produces water-piping fittings and kitchen ranges, and the Varanchinsk factory makes electrical apparatuses. Only two of them continue to produce metal and these have been modernized and their capacity increased. They put out not the ordinary but special pig iron: malleable, special forge, hematite, mirror and ferrosilicon (an alloy of iron and silicon). A big new works, the Novo-Tagil, which is of the same type as the Magnitogorsk Works, has been added to these factories.

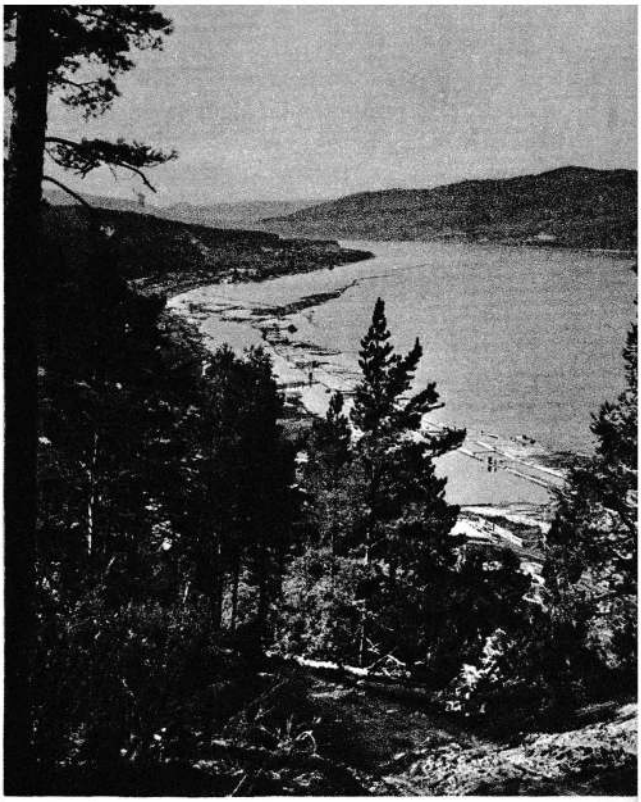
The giant Urals Carriage Works, built in the thirties, stands in a forest seven kilometres east of Tagil. To operate at full capacity it requires hundreds of thousands of tons of various materials, chiefly metal and timber. For that reason it is situated in the very heart of the Urals metallurgical industry. It receives ordinary metal from the Novo-Tagil plant, and special metals from the smaller enterprises in the district. Its timber comes from the north, from the sawmill in Sosva. The assembly shop, which is the main department in this factory, is a full kilometre long.

Tagil District is also the home of the Urals copper industry. Today,

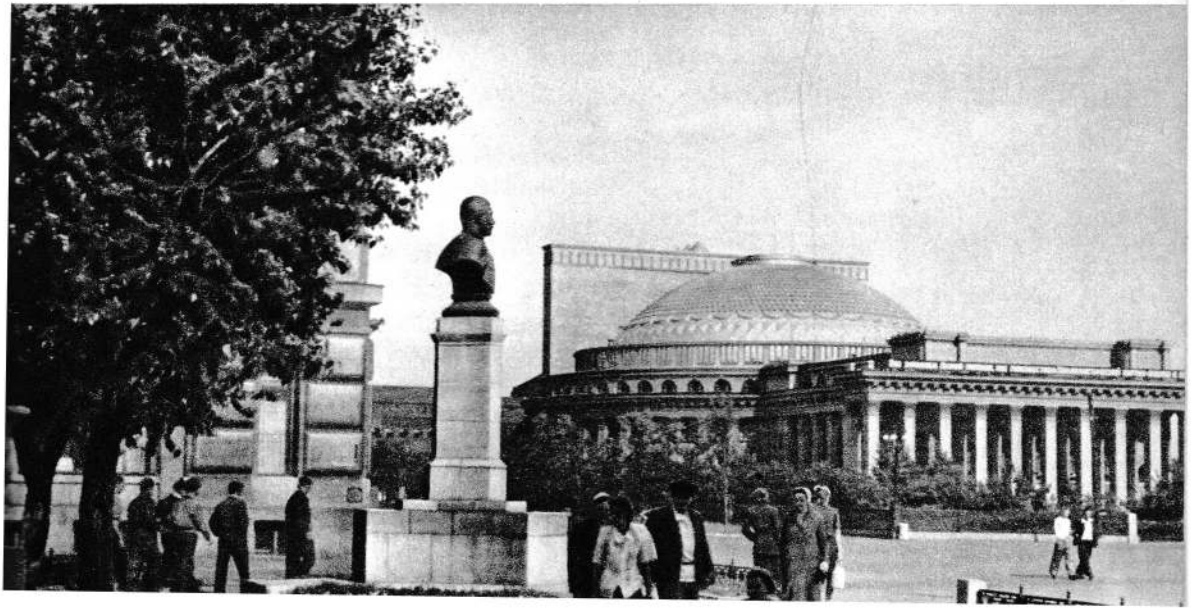
Community Centre of the Chelyabinsk iron and steel workers

Pouring steel at the open-hearth furnace department of the Kuznetsk Iron and Steel Works

The Yenisei in Krasnoyarsk Territory

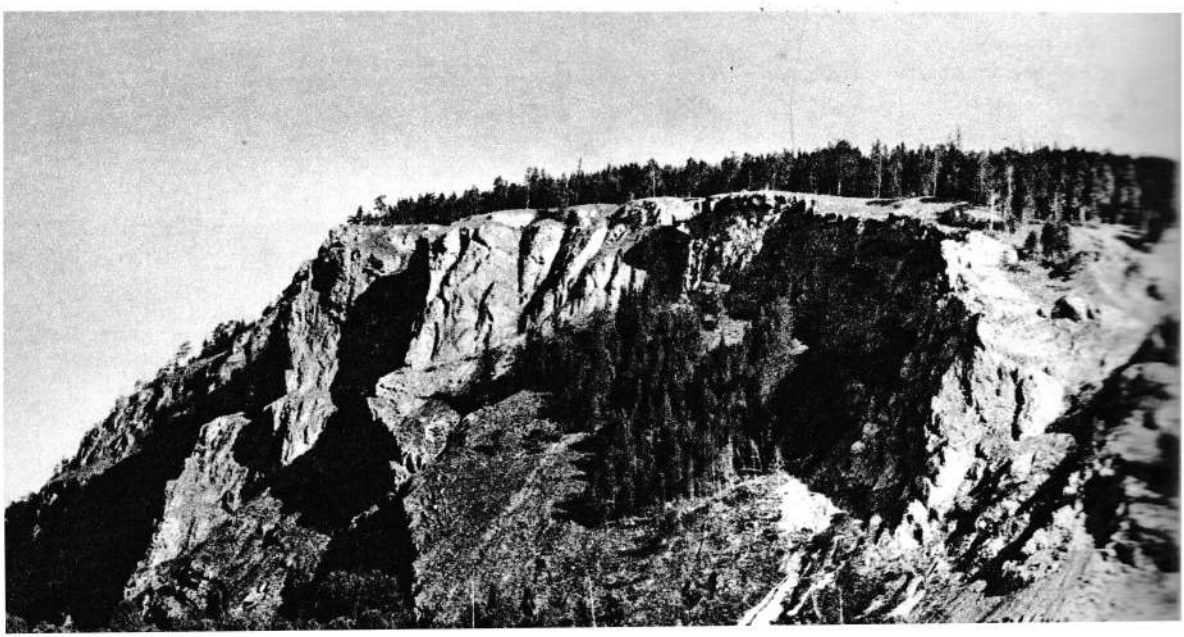


Opera and Ballet Theatre, Novosibirsk



Collective-farm herd of reindeer on Taimyr Peninsula

Dolomites on the Lena, Yakutia



the Kirovograd copper-smelting works near Nevyansk has been modernized, enlarged and fitted with up-to-date equipment. A concentrating factory, which separates copper from zinc, has been built here. Ore reaches the works from around Tagil by a special ore-carrying railway. A chemical factory, which sprang up beside it, produces sulphuric acid from the sulphuric gases leaving the copper-smelting furnaces. The factory is fitted with a newly-designed installation that arrests the dust of zinc ore and rare elements as it leaves the furnaces together with the gases.

Great copper deposits have been discovered east of Kushva in Soviet years. This has led to the rise of the new town of Krasnouralsk in the depths of the taiga.

Gold-fields are scattered in the whole of the Tagil industrial district, particularly along the upper reaches of the Tagil River and to the west of it.

The platinum-fields in the northern part of this district have been worked since the mid-19th century. These fields also yield gold.

In the northern part of Sverdlovsk Region there is the Serov High-Grade Metals Works, which developed out of the Nadezhdinsk factory built at the close of the 19th century.

The extraction of bauxites (Severouralsk) and the accompanying production of aluminium (Krasnoturinsk) have been organized in Soviet years in the Bogoslovsky Coal Basin near Serov.

In the industrial districts of Sverdlovsk Region farming is confined to the land between factories and mines and is of an auxiliary nature. The chief branches are animal husbandry and vegetable-growing. Frequently vegetable fields can be seen on the sites of old mines or on land reclaimed from young forest undergrowth. Of grain crops the farms sow winter rye, spring barley and oats, and a little wheat. The best farmland is in the valley of the Tura River and in the neighbourhood of Kushva. The northern part of the region is completely under forests, which supply raw material for the sawmills, woodworking factories and paper mills.

These forests abound in raspberries, bilberries, cranberries and mushrooms, great quantities of which are laid in for the winter by the population.

Industry does not play the dominating role in the other districts

of Sverdlovsk Region. Both the south-eastern part situated along the railway to Tyumen and the south-western forest-steppe area are primarily agricultural districts. Timber is a major commodity in the north-eastern part of the region which lies in the West-Siberian Lowland.

Perm Region with its vast power resources is of great economic importance in the Urals. The whole of this region is in the European part of the Urals and has big deposits of minerals, some of which do not occur in any of the other regions of the Urals. For example, rich deposits of potassium salts have been discovered here. This region also has iron ore, while copper-bearing sandstone occupies enormous areas. Perm Region has half of the Urals' coal and peat and two-thirds of their power resources. Oil has been found here as well as great reserves of building materials—gypsum, limestones, various kinds of clays and sands, and natural dyes. A very high level of development has been achieved by the region's economy in Soviet years and it became an important industrial area with big engineering, chemical, coal-mining, metallurgical, timber and paper enterprises.

The chief city of the region, Perm, has about 628,000 residents. It extends for more than 40 kilometres along the Kama River and has large engineering, chemical and wood-working factories. At the same time it is the biggest transport junction and trans-shipping point in the region.

A big hydropower station has been built on the Kama somewhat above Perm to feed the city's industry.

The first paper, cellulose and timber-chemical combine was built in the Urals in 1931 on the Vishera River, a tributary of the Upper Kama, in a dense forest area. That gave rise to an important centre, the town of Krasnovishersk, which was a place of exile under tsardom. Ships now come to this town from the Kama. A bigger paper and cellulose combine than the one on the Vishera was built in 1940 below Solikamsk on the Kama. These two factories made the Kama area one of the major suppliers of paper and cellulose in Russia.

The mining and chemical industry, which is concentrated in a small area on the Upper Kama, is another of this region's leading branches of economy.

Kama salt, which gave the town of Solikamsk its name, gave rise to the first mining industry in the Urals. Salt has been extracted here for nearly 500 years, almost from the 15th century. Numerous age-blackened saltworks with the acrid smell of alkalines around them were massed on both banks of the Kama in the villages of Usolye, Lonva and Dedyukhin. Boilers in thick, low brickwork and the log-frames of salt mines dating from the days of Ivan the Terrible have survived in these places.

At a later date, a salt and soda factory was built in Berezniki.

Reserves of potassium salts that are five or six times greater than the known reserves in the rest of the world were discovered here in 1925 at depths ranging from 92 to 300 metres. These deposits stretch southwards from Solikamsk for scores of kilometres. The layers consist of sylvinite (a mixture of potassium chloride and common salt) and carnallite (potassium chloride and magnesium chloride). Development of these deposits was started in 1934 and the enterprises that have been built include two mines, a concentrating factory and carnallite-processing plants. From here hundreds of thousands of tons of potassium fertilizers are sent by water and rail to the northern and southern podzol areas growing vegetables, tobacco, sugar-beet and other crops.

There is a big potassium combine in Solikamsk.

A modern town and industrial centre with a large population has appeared deep in the forests near Solikamsk. Compared with it, old Solikamsk with its small, low houses seems a museum relic. This impression is intensified by the 300-years-old stone churches in the middle of the old town. The underground passages beneath them were used by the Solikamsk voivodes as a treasury, fortress and prison.

In place of the old soda works there is now the huge, modern Berezniki Chemical Factory. The factory's tall towers stand right above the Kama and are reflected in its waters. The new town of Berezniki has been built round this factory.

The old centres of the salt industry—Lonva, Dedyukhin and Usolye—have likewise become towns.

The Upper Kama industry is linked up with the Kizel Coal Basin, the oldest in the Urals. For its quality, Kizel coal is the best in this region. It is used by the chemical and the metallurgical (in a mix-

ture with Kuznetsk coal) industries, as a gas-generating fuel and as fuel for power stations and steam engines. This coal region extends for 50-60 kilometres from north to south along the railway. Its centre is the town of Kizel. Many new modern workers' settlements with palaces of culture, cinemas, schools and hospitals have been built round the collieries.

Farming led by animal husbandry is well developed in Perm Region. Farms growing potatoes and other vegetables have been organized around the towns.

West of the Kama there is the Komi-Permyak National District where nearly three-quarters of the population consists of Komi-Permyaks. This district is completely in the taiga zone and is one of the most important timber areas of the Urals. It supplies timber for the paper and cellulose industry in Perm Region and building timber for the entire Urals and Volga Area. Agriculture is also well advanced in this district. Since time immemorial, the people have been growing rye, oats and barley. At present, the area under wheat has been considerably enlarged. The southern part of this district belongs to what is known as the Urals "flax wedge." The town of Kudymkar is the district's administrative and economic centre with metal and wood-working factories, flax mills, a national theatre and a local lore museum.

The Udmurt Autonomous Republic, situated between the Kama and the Vyatka rivers, adjoins Perm Region on the west where the western spurs of the Urals give way to a plain. Coniferous and broad-leafed forests cover most of Udmurtia. Valuable species of trees like the oak, the maple and the larch also grow in these forests.

In pre-revolutionary times, primitive farming was the chief occupation of the Udmurts, who make up more than a third of the population in the republic. The wooden plough was the only farming implement they had. In order to clear land for crops, they had to burn and uproot trees. The soil, which did not receive any fertilizers, was quickly exhausted and yields dropped from year to year.

The life of Udmurtia underwent radical changes after the October Revolution. The people received national autonomy, which brought with it a tremendous advance in economy and culture and wiped out illiteracy. The organization of collective farms and comprehensive

mechanization in agriculture have completely transformed the Udmurt countryside. Crop areas were extended and productivity increased. Wheat began to be cultivated and flax came to have an incomparably larger share of the crop area. A new, prosperous life began for the Udmurt peasants.

Similarly far-reaching transformations have taken place in the industry of Udmurtia. Large-scale geological prospecting has brought to light considerable natural wealth. Deposits of combustible shale, various building materials and natural dyes have been discovered.

In modern Udmurtia, machine-building is playing the leading role in industry.

The Izhevsk Factory, built in the 18th century, has been completely reconstructed. The Soviet Union's first motor-cycle works was erected in Izhevsk. The Votkinsk Metal-Working Plant, founded in the 18th century, has been considerably renewed and enlarged.

Timber occupies a prominent place in Udmurtia's economy. It has several big sawmills and wood-working factories. The new town of Mozhga, the centre of the wood-working industry, sprang up on the Kazan-Sverdlovsk Railway in the southern part of the republic. A factory producing tanning extracts has also been built here. The town of Izhevsk has Europe's largest gas-generator station operating on firewood. Large quantities of timber are produced for other areas in the Soviet Union.

Izhevsk, capital of Udmurtia, is now not only an important centre of industry but is also a seat of culture. With a population of more than 280,000 people, it has four institutions of higher learning and several technical schools. A special research institute has been established to study the culture and history of the Udmurt people.

Udmurtia's second biggest centre is the town of Votkinsk, birthplace of the world-famous composer Pyotr Chaikovsky.

In the south, Sverdlovsk Region is adjoined by Chelyabinsk Region.

Iron ore, primarily the celebrated Magnitogorsk and Bakal deposits, occupy first place among its tremendous reserves of minerals. At Mount Magnitnaya, drag-lines load huge lumps of reddish-brown magnetic iron-clay on trains that take it to the Magnitogorsk Works, which is one of the biggest metallurgical plants in the world. The region also has rich deposits of brown coal and anthracite, copper,

zinc, nickel, titanium magnetites and various building materials. With the exception of iron ore, this wealth was almost untouched until the Revolution.

Today Chelyabinsk Region has big, modern iron and steel, engineering and coal industries.

Besides the Magnitogorsk factory, ferrous metallurgy is represented here by the Chelyabinsk and Zlatoust plants. There are many engineering factories producing tractors (including the Chelyabinsk Tractor Works, which was the first of the Soviet tractor factories), grain combines and other farming machines, as well as automobiles, carriages, electrical equipment and so forth. Other factories in Chelyabinsk produce ferro-alloys, pipes, and non-ferrous metals (copper and nickel).

Farming, both land cultivation and animal husbandry, are of greater importance here than in Sverdlovsk Region. The chief crop is spring wheat. Melons are grown in the south of the region. Large areas of virgin and disused land have been ploughed up in recent years.

Chelyabinsk is an old Russian town on the Miass River. It was founded in the mid-17th century. Before the Trans-Siberian Railway was built it was to a large extent isolated from the country's economic life, but this situation changed radically when the town found itself on the railway connecting Europe with Asia. It began to grow, becoming an important market for grain and other agricultural produce. Today, in addition to being the gate from Europe to Asia, Chelyabinsk is an important industrial centre of the South Urals.

The city's industries receive their electric power from a large thermal-power station using coal from the coal basin lying to the southeast of the city. A new town of miners and machine-builders called Kopeisk has appeared in this basin.

Industrial development is being accompanied by a swift growth of the population. In 1926, Chelyabinsk had altogether 59,000 residents, but by 1959 there were 688,000 people in the city. In Chelyabinsk there are five institutions of higher learning and quite a few other educational and cultural establishments.

The city of Magnitogorsk, built in the early thirties, is situated in the south of Chelyabinsk Region on the Ural River close to the great

iron-ore deposits of Mount Magnitnaya. A railway laid across a level dry steppe runs southwards to this city from Chelyabinsk. Magnitogorsk can be seen from a train long before it is reached. Mammoth blast-furnaces with their tall smoking chimneys, and the massive buildings of the factories rise above the horizon. The contours of Mount Magnitnaya, to which Magnitogorsk owes its rise, can be made out near the city, which grew up together with the giant iron and steel works, a project which was built with the help of the entire country.

In addition to this works, there are factories producing mining and other equipment.

The initial site for the city was the left bank of the Ural River, but subsequently the central part of the city moved to the right bank because of the winds prevailing in this region. The smoke and soot from the iron and steel works do not reach the right bank. Like the other Urals industrial centres, Magnitogorsk grew rapidly and had a population of 311,000 people by 1959. The city gets most of the specialists it needs locally, training them at the Mining and Metallurgical Institute. Magnitogorsk also has a teachers training institute.

Near Mount Kosotur on the western slopes of the Urals lies the town of Zlatoust, which has long been famous for its stainless steel. This fame is even greater than it was before, for Zlatoust is now known as a centre of high-grade metallurgy and machine-building.

Miass, the seat of the Urals gold industry, is situated to the east of Zlatoust. This is a rich gold region and nuggets weighing several kilogrammes are not a rarity. This industry is armed with hydraulic installations and giant dredges, each of which supplants the labour of 2,500 workers.

The already-mentioned Ilmensky Mineralogical Preservation is situated near Miass on the eastern slopes of the Urals.

Prior to the Revolution, Orenburg Region had a commodity capitalist agriculture with a poorly developed industry engaged exclusively in processing. This is the extreme south of the Urals. Here the mountains are superseded by hills, the woods disappear and an endless feather-grass steppeland stretches along both banks of the Ural River.

The geological prospecting begun in the twenties has fundamentally transformed the economy of this region. Geologists have discovered extremely rich deposits of valuable brown and red hematites, copper, magnesite, coal, oil and combustible shale.

This formed the basis on which great industries were built. An iron and steel works producing valuable sorts of steel was built in Orsk following the discovery of natural alloy iron ores in the Orsk-Khalilovo area. The different districts began specializing in one branch of industry or another: oil (Buguruslan District), machine-building (Buzuluk District) and copper-smelting (Mednogorsk District). New towns and workers' settlements grew up.

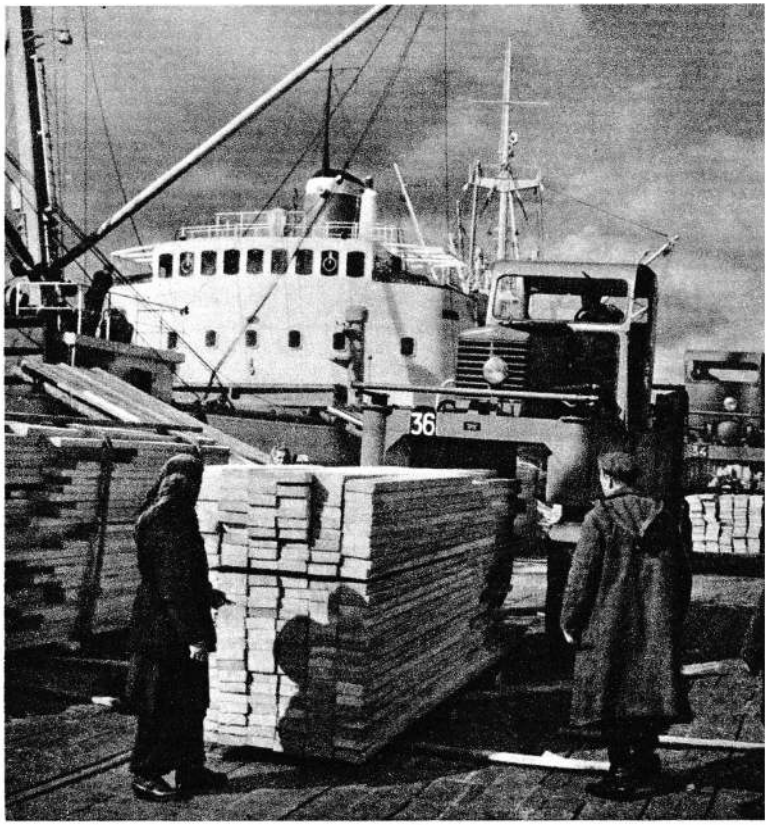
In spite of this rapid industrial development, agriculture lost none of its former importance. Wheat, vegetables, fodder crops and sunflowers are grown in the western and central parts of the region where the farms are run with the help of machines. A total of 1,500,000 hectares of virgin and disused land was ploughed up in this region in 1954-55. Productive animal-breeding, chiefly sheep-breeding, predominates in the steppes of the eastern and southern parts of the region.

Orenburg, the regional centre, was built in the first half of the 18th century as a fortress and the seat of the barter trade with Kazakhstan and Central Asia. The Fortress of Orenburg was first founded at the confluence of the Ori and Ural rivers, but somewhat later it was moved to a new site at the confluence of the Ural and Sakmara rivers, where the town of Orenburg finally took shape. The old fortress, which is described in Alexander Pushkin's *The Captain's Daughter*, developed into the town of Orsk.

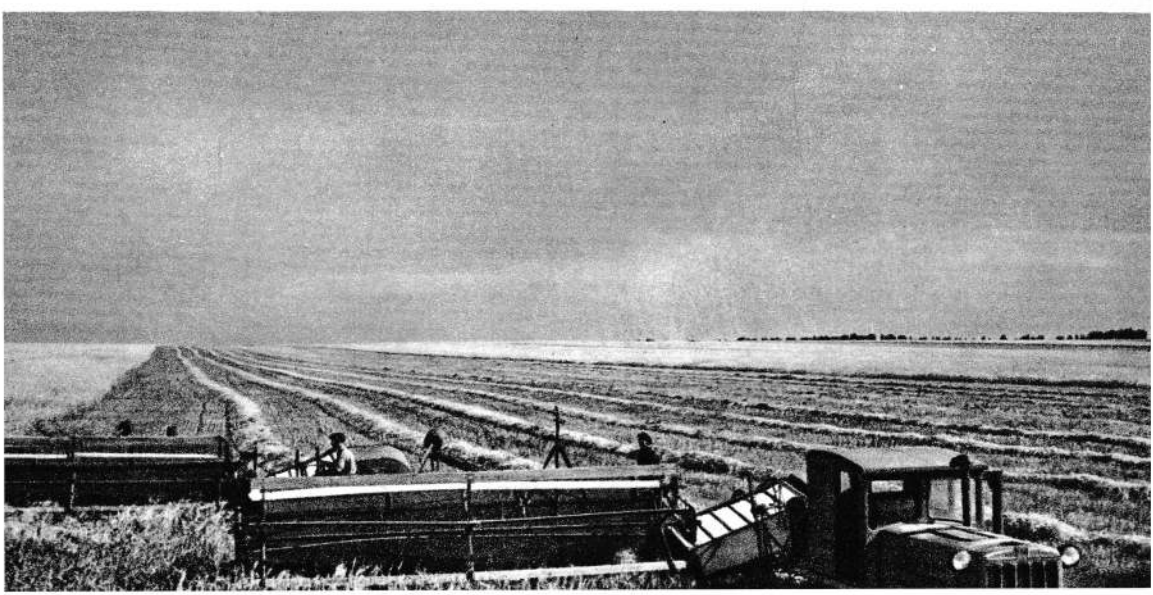
Soon after it was founded, Orenburg became the centre of the Orenburg Cossacks. The construction of a railway to Samara heightened the town's importance as a goods depot and market on the roads to Central Asia. Quite a few factories were built in the town to process the products received from the Orenburg steppes, where grain-farming and animal-breeding were ancient occupations.

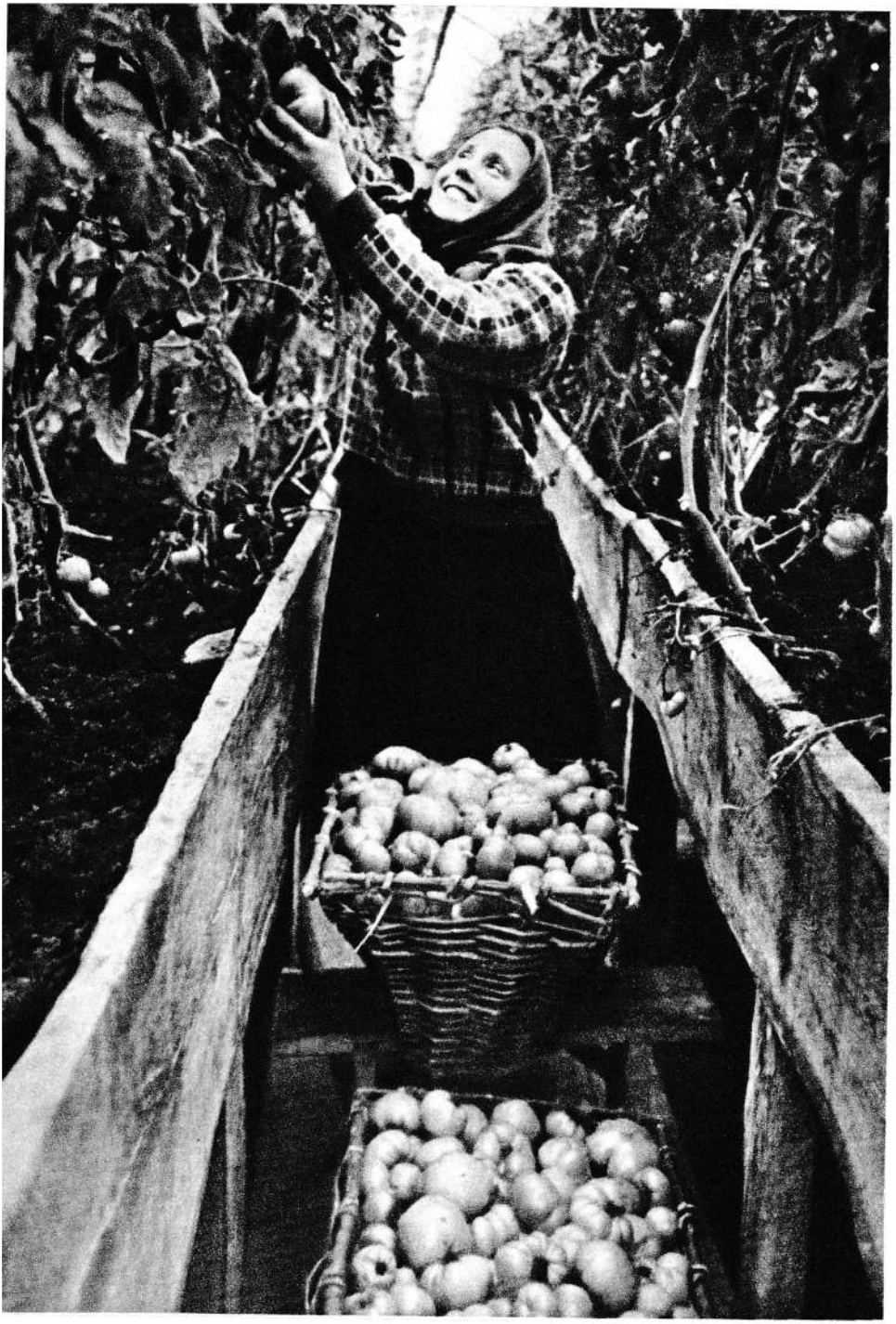
In Soviet years Orenburg's industry continued to develop but the leadership was captured by the heavy industry which was new to the town. Engineering factories—machine-tool, instrument-making, carriage and locomotive repair works—began to appear one after anoth-

Igarka, a major port on the Yenisei



Harvesting wheat in the Altai





er. New branches of the light industry were built. A large silk-weaving mill was erected. All aspects of the town's life made marked progress. It became an important organizational, economic and cultural centre of the southern part of the area west of the Urals. In 1956, there were 260,000 residents in Orenburg. Today, the city has four institutions of higher learning and an institute of beef and dairy farming research.

Bashkiria, the first of the autonomous republics in the Soviet Union, is situated on the western slopes of the South Urals. The republic is crossed by the Kuibyshev-Chelyabinsk Railway and by the Belaya River which flows from north to south.

The thick layers of chernozem, the rich pastures and the great mineral wealth of Bashkiria had long excited the lust of tsarist officials, landlords and industrialists. From the 18th century and almost up to the Revolution, Bashkiria was plundered savagely and cynically. By the time the Revolution broke out the Bashkir people owned only 30 per cent of the land in what was formely Ufa Province. But pre-revolutionary Bashkiria was a restless colony of tsarism and uprisings were frequent. By a special edict, Tsaritsa Anna Ioannovna prohibited even the trade of smith in Bashkiria, so that the Bashkirs would be unable to forge their own weapons. Many Bashkirs took part in the Pugachov uprising, which was the biggest peasant uprising in Russia in the 18th century.

Soviet power brought freedom to the people of Bashkiria. They were helped to form a written language and this was followed by the shaping of Bashkir literature, art and a national intelligentsia.

Bashkiria became an important industrial region with oil playing the leading part. The Ishimbai, Tuimazy, Shkapovo and other Bashkir oil deposits make up the nucleus of the "Second Baku." In addition, Bashkiria produces machines, electrical apparatuses, timber and agricultural raw materials.

Where once grain crops were grown, large areas are now sown to fodder grasses, sunflowers and sugar-beet. The first sugar-refinery in the Urals was built in the republic.

Ufa, capital of Bashkiria, now has 546,000 residents. It has become one of the leading industrial centres of the Urals and has expanded to almost three times its pre-revolutionary size. It has factories

manufacturing mining equipment and typewriters. Ufa is a big cultural centre with a branch of the U.S.S.R. Academy of Science, five institutions of higher learning, many secondary educational establishments, research institutes, and three theatres.

SIBERIA, A LAND OF INCALCULABLE WEALTH

Siberia is situated east of the Urals.

This is a land where dimensions are prodigious. Whatever is described it is rarely possible to avoid epithets such as "biggest," "most powerful" and "richest."

The wealth of Siberia is beyond measure. For long years, Russian progressives visualized the great future lying before this area and foretold the immense role it would play in building up the economic might of Russia. "Russian might," Mikhail Lomonosov wrote prophetically, "will grow as Siberia develops." Alexander Radishchev, who was exiled to Ilimsk at the close of the 18th century, wrote passionately: "What natural wealth! What power!... As soon as it is settled it will play a great role in the history of the world."

Some of the figures applied to Siberia seem incredible. For example, it is hard to picture an uninterrupted forest occupying a territory of 3,700,000 square kilometres. Yet that is the size of the Siberian taiga. The territory occupied by Siberia (10 million square kilometres) is more than double the area of the European part of Russia and is two times bigger than the whole of Western Europe. It is bigger than the continent of Australia. From west to east, Siberia is 7,000 kilometres long. Each region or territory in Siberia is like a whole kingdom. For example, Krasnoyarsk Territory is bigger than Britain, Germany, Italy and Spain combined.

The West-Siberian Lowland, the most extensive plain in the world, stretches from the Urals to the Yenisei River. In spite of its great size it is ideally even. Where the Irtysh leaves the Altai Mountains, the lowland is only 200 metres above sea-level, in spite of the fact that from here it is more than 3,000 kilometres to the Arctic Ocean. In the south-east, the West-Siberian Lowland is bounded by the Altai Mountains which are adjoined in the east by the Salair Range and by the Kuznetsk Ala-Tau.

SIBERIA

There are many glaciers between the snow-capped peaks of the Altai Mountains, the tallest of which is Mount Belukha, which rises to an elevation of 4,620 metres.

East of the Yenisei, the vast expanses are occupied by high-lying plateaux and mountains separated by short lowlands or river valleys. The huge Mid-Siberian Plateau between the Yenisei and the Lena gives way to the Sayan Mountains in the south and to the Yablonovy, Stanovoi and Verkhoyansk ranges in the south-east.

The taiga runs in a broad green belt across the whole of Siberia from west to east. A veritable ocean of trees, it embraces the central part of the West-Siberian Lowland, the enormous watersheds of the

Mid-Siberian Plateau and climbs up the slopes of mountains. These dense forests are broken only here and there by moss-covered peat-bogs or green meadows.

In the taiga zone, the summers are hot and the winters cold and long, lasting from five to seven months with abundant snowfalls (in Western Siberia). East of the Yenisei, the climate is especially rigorous with eternal congelation prevailing almost everywhere; there is very little precipitation. In the region of Oimyakon (Yakutia) the temperature in winter drops down to 70° C. below zero. Here the annual temperature amplitude reaches 100°C. Despite these low temperatures, the Siberian winter is usually sunny and healthy. The Siberian frosts are not as dreadful as they seem. They are easily borne because the air is dry and motionless. When there is no wind, people lose about as much warmth in a frost of 50°C. as in a frost of 20°C. combined with a moderate wind.

Silence reigns in the taiga in winter and it is broken only by the cracking of trees in the frost. Huge, century-old pines, cedars, silver firs and spruces tower high into the sky, patches of which can be seen between their crowns. In the summer, the foliage almost completely shuts out the sunlight and for that reason the grass of the Siberian taiga is devoid of bright flowers. The moment a cloud hides the sun, the taiga turns sullen and the weather seems inclement. But then, on a clear summer day, the cun-bathed trees, the bright-green foliage, the shining pine needles and moss and the bright lichens take on a decorative appearance. Many marsh plants—marsh tea, bog whortleberry, cloudberry and sedge—grow in the grass carpet of the taiga fir thickets. Berries ripen in the summer, while great numbers of mushrooms push their way out of the ground in the autumn. Red bilberries are especially plentiful. Raspberry, bird-cherry and sea-buckthorn thickets fill the river valleys and the shores of lakes.

In the mountains there is only a thin layer of soil and for that reason the roots of the trees do not sink far into the ground but spread along the surface. Here the trees are not firmly rooted and are easily tipped over by the wind. A fallen tree tears up its roots together with the earth and the stones wedged in them. Some of these "barricades" are several metres high and the forest paths wind around them.

In the taiga, movement is hindered not only by fallen trees but also by clouds of tiny midges whose bites are extremely painful.

The *urmans* or *chern* are the thickest and most impassable forests of the Siberian taiga. These are dark, damp coniferous forests occupying the hilly ground amidst marshland. The huge spruce-trees grow somehow obliquely as though some invisible force had moved the ground from under them. Between them lie heaps of wind-fallen branches. Here and there trees broken by lightning or the wind are piled up one on top of another. As they fall they become entangled in the thick branches of the neighbouring trees. Even the graceful pyramidal silver fir loses its beauty amid this chaos.

The taiga is full of giant trees that are from 25 to 30 metres tall and up to 4.5 metres in circumference. Hollows in trees like these are sometimes the dens of bears.

The predominant trees in the Siberian taiga are the larch, the pine, the silver fir, the spruce and the cedar.

The Siberian larch is the mightiest and most beautiful tree of the taiga. It makes fine building timber which is resilient, tough and moisture-resisting. Thanks to this, the larch is used in ship-building and for underwater structures. Behind the Yenisei, the Siberian larch is replaced by the Daur larch, which is not as tough and is therefore used more in the paper and cellulose industry. Its branches yield oil for the production of camphor. Siberian cedars are valued highly. Some of them are 85 metres tall and 2 metres thick. The seeds of these trees yield oil that is used for *khalva* (a paste of nuts, sugar and oil) and other confectioneries. This timber is excellent material for furniture and for finishing furniture.

The taiga abounds in birch and asps, growing usually among coniferous trees. The birch is used for plywood, while the asp goes for the manufacture of matches.

In addition to this colossal wealth of timber, the taiga yields countless numbers of fur-bearing animals.

Chief place among them is occupied by the sable, including the wonderful Barguzin sable, the marten, the ermine, the kolinsky, the weasel, the glutton, the squirrel, the chipmunk, the badger and the otter. In winter, the reindeer and the polar fox move down from the tundra into the northern zone of the taiga. There are many bears,

wolves, foxes and lynxes. Silver foxes, sables, beavers, racoon dogs and musk-rats are systematically bred in the Siberian taiga to prevent depletion of the number of valuable fur-bearing animals. Siberian fur is exported all over the world.

The stern tundra is in the Extreme North of Siberia. Lichens (particularly Iceland moss) and creeper bushes are about the only vegetation, and there are many bogs with peat mounds.

Iceland moss is the chief form of fodder for the reindeer. In summer, it feeds on other plants (leaves of bushes, grass, mushrooms) but in winter, this moss, which it digs out of the snow with its hoofs, is practically its only food.

The tundra zone of Russia is the world's leading reindeer ground. Almost two-thirds of the world's domesticated reindeer are concentrated there and in the adjoining forest zone. Under the conditions obtaining in the Extreme North, reindeer-breeding is the most profitable branch of agriculture.

In the tundra with its eternal congelation, the climate is rigorous. The winter lasts from eight to nine months. In mid-winter, the sun hides behind the horizon, giving way to the polar night which is nearly three months long.

Aurora Borealis frequently lights up the sky during the long polar night, sharp pencils of light suddenly shooting up into the clear star-spangled heavens from different places. These beams rise swiftly, widen and form a clearly outlined arc that takes on the most diverse shapes. Sometimes it resembles a curtain or a ribbon waving in the wind and consisting of a series of pale reddish and greenish bundles of light. Smoking, iridescent and moving, they constantly change their colour. A soft glow fills the entire sky.

This is always a splendid and breath-taking phenomenon. People who see it for the first time take long to recover from this beautiful and at the same time awe-inspiring spectacle of mysterious, multicoloured waves of light continuously moving in the sky. The northern lights are especially spectacular when the huge arcs rise high in the shape of a sword.

Aurora Borealis, the electric action of the sun on the upper layers of the atmosphere, never fails to attract the attention of investigators.

Southwards, the taiga zone is superseded by fertile steppes, which

are particularly extensive in Western Siberia. Until lately, there were enormous tracts of virgin and disused land in the Kulundinskaya, Rubtsovskaya and other steppes, but these have been developed and they now yield big harvests of grain crops.

Let us now turn to Siberia's great mineral wealth.

It has the Soviet Union's biggest reserves of coal, the chief worked deposits lying along the Siberian Railway. These are the Kuznetsk Basin in Western Siberia and the Irkutsk (Cheremkhovo) Basin in Eastern Siberia. The Minusinsk Basin, meanwhile, is the coal base of Krasnoyarsk Territory.

The Kuznetsk Ala-Tau and the Salair Mountains are separated by the Kuznetsk Hollow, which is the site of the great Kuznetsk Coal Basin. The reserves of this basin are estimated to run into hundreds of thousands of millions of tons. A considerable part of this consists of coking coals.

The Tunguska Coal Basin, the biggest in Siberia, is rich in anthracite. It is believed that there are 1,500,000 million tons of coal there. This basin is situated in the north of Krasnoyarsk Territory, far from the industrially developed regions of Eastern Siberia. The southern, Angara part of the basin is known to contain unique seams, some of which are from 60 to 90 metres thick and can be open-worked. Yet to be touched by man, this colossus is awaiting its hour. Siberia's second coal giant is the Lena Basin. It, too, is practically untouched. New railways will have to be built before these basins can be developed.

Much of the central part of Krasnoyarsk Territory is crossed by a broad belt of coal-bearing deposits forming the Chulym-Yenisei and the Kan basins, which are frequently called the Kan-Achinsk Basin. These are brown-coal deposits and the quantity there is estimated at nearly 1,200,000 million tons.

The huge South-Yakut Coal Basin was only discovered recently along the Aldan River. The importance of this discovery is particularly great in view of the immense deposits of iron ore that have been brought to light a relatively short distance away. With time, a new ferrous metals centre will be created here.

Without exaggeration, Siberia's reserves of iron ore can be said to be inexhaustible.

At the moment, the deposits of magnetic ore near the Kuznetsk Coal Basin are the chief ore base of the Siberian metallurgical industry. This ore, coming from several mines in Gornaya Shoria, goes to the Kuznetsk Iron and Steel Works. The Abaza mine, Western Siberia, was opened recently, while the nearby Teisky mine is under construction. When the latter mine is commissioned, the Kuznetsk Works will be completely freed from the necessity of carrying ore from the Urals. The West-Siberian Iron and Steel Works (now under construction in the Kuzbas), which will have a greater output capacity than the Kuznetsk plant, will likewise have its own ore.

Brown iron ore was discovered during boring operations at a depth of 100-200 metres in the region of Kolpashovo and Narym, to the north-west of the Kuzbas, on the Ob River. According to preliminary estimates, these reserves amount to a few score and possibly to more than a hundred thousand million tons.

Magnetic iron ore has also been found on the Angara, in the region of the Bratsk Hydropower Station. A large mine, which will supply ore to the metallurgical plant under construction in this area, is being built at Korshunovo, the biggest of the Angara deposits.

Lastly, tremendous iron-ore deposits have been found to the east of Lake Baikal.

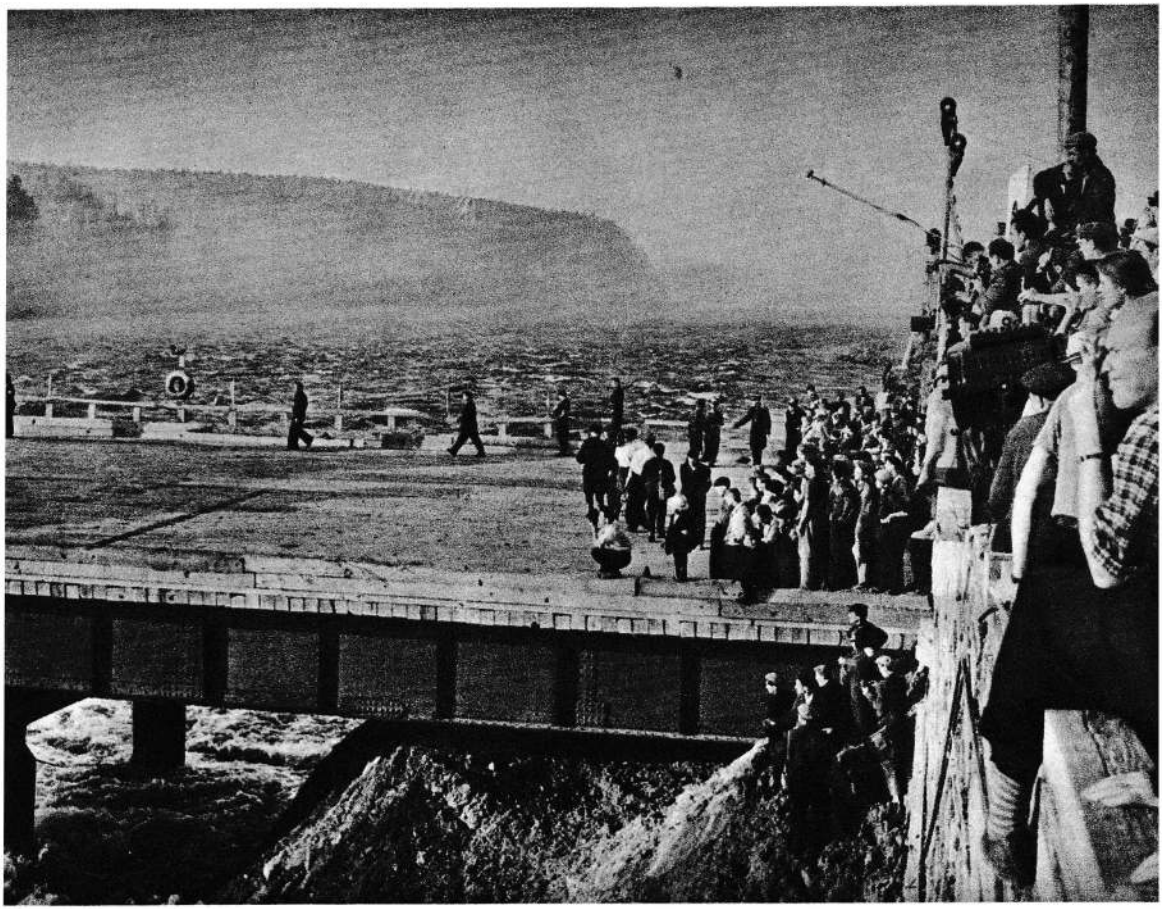
This wealth is a reliable foundation for building up a big ferrous metals industry in Siberia.

As in the case of coal, Siberia holds first place in the U.S.S.R. for its reserves of tin, gold, mica and graphite.

Siberia has plenty of manganese, lead, zinc, copper, mercury, tungsten and various chemical and building raw materials. Non-ferrous and rare metals are especially abundant in the Altai Mountains and in the Salair Range, while the Lena, the Vitim and the Kolyma basins are famous for their gold-fields. Huge nuggets are found in these basins. A nugget weighing 12.4 kilograms and shaped as a disc measuring 20 by 20 centimetres was found in the Bodaibo goldfield in 1957.

Geologists working deep in the Siberian taiga in Yakutia have recently brought to light large deposits of diamonds. The biggest of these was named the Pipe of Peace. Large-scale development of this wealth will be started in the immediate future. The plan of diamond-

Plougning-up virgin soil in Siberia



Damming up the Angara at the building site of the Bratsk Hydropower Station

New town of Angarsk, Irkutsk Region

Maize for silage in Irkutsk Region

field extraction has been worked out and tested and special machines and equipment are being made. These deposits will yield not only industrial but also jeweller's diamonds.

Natural gas has been discovered in Yakutia and in Western Siberia. There are particularly large reserves of gas along the lower reaches of the Ob.

This gas is a raw material for the chemical factories producing plastics and nitrogen fertilizers. In Siberia, agriculture is acutely in need of these fertilizers, for the summer is short, and by artificially increasing the fertility of the soil it would be possible to accelerate the ripening of crops.

Natural gas is not only a base for many industries but it also allows supplying the Siberian towns with gas and thereby freeing thousands of trains from carrying coal over long distances.

Siberia also has enormous reserves of "white coal," the energy of its mighty rivers. The snows of the Altai and the Sayan mountains give birth to the Ob, the Irtysh and the Yenisei, while the Lena rises in the Baikal Mountains. Crossing the taiga and the tundra, they take their abundant waters to the stern seas of the Arctic Ocean.

The Siberian rivers contain considerably more water than the rivers of the European part of Russia. While the Volga carries 255,000 million cubic metres of water annually, the corresponding figures for the Ob, the Lena and the Yenisei are 394,000 million, 488,000 million and 548,000 million cubic metres.

The giant Yenisei is at once imposing and beautiful. Out of respect for its size and power, Siberians call it Father Yenisei.

"With all diffidence to the zealous admirers of the Volga, I must say that in my life I have never seen a more magnificent river than the Yenisei," wrote Anton Chekhov. "Never mind if the Volga is a modest and melancholy beauty, but the Yenisei is a great and unrestrained giant who does not know what to do with his energy and youth.... The banks of the Yenisei seem too low to hold in the waters. The low waves race and jostle each other, describing spirals, and it seems strange that this Samson has not yet washed away the banks or bored through the bed.... As I stood there I thought of the full, wise and bold life that will in time throw light on these banks."

The Yenisei is the most powerful of the 108,000 rivers in the Soviet

Union. It is so fast that at the Krasnoyarsk beaches ropes are stretched to prevent the bathers from being washed away. It flows even faster after accepting the exceptionally swift, cold and clear waters of the mighty Angara.

The Angara has its source in Lake Baikal, which is the deepest and one of the biggest lakes in the world. It occupies an area of 31,500 square kilometres and its depth reaches down to 1,741 metres.

There is so much water in Lake Baikal that if the Angara were to flow continuously with a constant expenditure of water and there were no sources from which to augment the supply of water, it would require more than 400 years to drain the lake. The lake's turquoise water is amazingly transparent and as cold as in the Angara. Underwater rocks, fish, shining shells and stones can be seen lying at a great depth.

Lake Baikal, surrounded by dense dark-green taiga and picturesque mountains with jagged crests, is celebrated for its beauty which is the theme of many folk songs.

A boat glides silently across the sparkling water which reflects the tall pines and cedars and the granite banks.... But the lake is not always calm and in stormy weather the waves are really formidable. Storms break suddenly and are caused by winds that usually blow in a definite direction: the north-easterly *barguzin*, the south-westerly *kultuk,* and the northerly *angara.* The most dangerous of these is the strong *sarma,* which blows in winter and autumn, giving rise to fierce storms and causing ice to form on ships.

This lake is amazingly rich in flora and fauna. More than 1,000 species of animals, mostly endemic, live in its waters. The typical food-fish are the omul, the grayling and several species of Baikal bullhead. The Baikal seal is an interesting animal and its silky skin, which is silvery in hue, is used for winter clothing.

West of Lake Baikal stands the Baikal Mountain Range, to the east—the Barguzin Mountains, and adjoining it in the south—the Khamar-Daban Range with the stately Peak Munku-Sardyk. Here and there the huge cliffs overhang the water.

The western shore of Lake Baikal, along which the railway runs, is extremely rocky and tortuous, with numerous bays, capes and tall cliffs. It required a great effort to lay the tracks for a railway here.

Following the twists and turns of the shore, the railway line has many tunnels cutting through the mountains. The biggest of these tunnels is nearly a kilometre long. Many of the ravines and bays are spanned by bridges.

The source of the Lena is 11 kilometres away from Lake Baikal. This is a beautiful river, especially along its middle and lower reaches. The famous Lena Pillars, formed as a result of the weathering and erosion of limestone, are on the right bank of the river between Olekminsk and Yakutsk. These intricate stone figures resembling ancient castles or battlements, which alternate with rows of pillars of the most diverse shape and colour (red, green, grey) show what a remarkable sculptress Nature can be.

The Lena has several tributaries—the Vitim, the Olekma, the Aldan and the Vilyui, each of which is a mighty river with a tremendous reserve of energy.

One of the greatest rivers in the world, the Ob with its giant tributary, the Irtysh, flows across the West-Siberian Lowland.

In remote times, Siberia was the arena of wars between different tribes.

The Siberian Khanate, a semi-feudal Tatar state, arose there in the late 15th century. In the reign of Khan Kuchum (late 16th century), this state embraced the Lower Irtysh, the Tobol and their tributaries. The Ostyak and Yugra tribes in the adjoining regions were vassals of this khan.

Russians first appeared in Siberia or Yugra, as the area east of the Urals was called, in the 11th century, but extensive development began only in the late 16th century.

In 1581, the Stroganovs, merchants and industrialists who received extensive lands in the Urals from the Moscow Government, sent Yermak, a Cossack captain, at the head of an expedition beyond the Urals. Leading a detachment of 540 Cossacks and 300 of Stroganov's mercenaries, Yermak began the conquest of the Siberian Khanate. Kuchum's forces were routed and the khanate crumbled. In order to retain the newly-conquered lands, the Cossacks sent for help to Moscow and the territory of the former Siberian Khanate was incorporated in the Moscow State.

To consolidate its foothold in Siberia, the government began to

build towns and fortresses in the strategically important places. The town of Tyumen was built in 1586 on the Tura River, while Tobolsk, which later became the administrative centre of the Siberian lands, was built in 1587 at the confluence of the Tobol and Irtysh rivers. The strongholds of Berezovo and Narym were erected on the Ob. Later, Tomsk, Kuznetsk and other towns were built. The southward advance was halted at the foothills of the Altai. The mountainous regions of the Altai were only incorporated in Russia in the 18th century.

Trade interests were what originally prompted the Moscow State to expand eastwards. The Siberian taiga was famous for its fur—sable, silver fox, beavers and other valuable animals. The Moscow State sent its voivodes to govern the new lands. The voivodes collected *yasak* (tribute) from the local population and built strongholds which were peopled with Cossacks, who kept law and order in the newly-incorporated lands. This was how the Cossack settlements on the Irtysh, Ob and Biya were founded. "State farmland" appeared round these settlements to supply the soldier population with grain. Peasant volunteers were sent to Siberia to husband this land. The Cossacks also received plots of land and engaged in farming near the towns. There were many exiles among the Siberian settlers. Old believers[1] and participants in the peasant uprisings led by Stepan Razin and Yemelyan Pugachov were exiled to these places.

The free settlement of Siberia went on simultaneously. Wanderers of all sorts and fugitive serfs made Siberia their goal. They were attracted by the unbounded spaces and the possibility of living a free life. At first the government put hardly any restraint on settlement of this kind, but by the end of the 17th century edicts appeared forbidding entry into Siberia without special passes issued by the government. But these prohibitive measures did not achieve their purpose.

Fugitives settled down in the dense taiga, cleared the forest, and built farms which later grew into villages. These free settlers pioneered the development of many regions in Siberia, showing by example that farming could be carried on successfully.

Russian agricultural colonization was a positive factor in the life

[1] People who refused to recognize the church reforms introduced by Patriarch Nikon in the late 17th century.

of the indigenous peoples of Siberia. Incorporation into Russia enabled these peoples to do away with their economic and cultural backwardness.

Side by side with the Cossacks, the first people to come to the Siberian towns were craftsmen—carpenters, smiths. This gave rise to a local market for agricultural produce. Western Siberia, where crops were sown on swiftly extending areas, sent grain to the close-lying northern and eastern regions.

The Moscow Carriage Road to Tomsk with branches to the southern steppe regions was built in the first half of the 18th century. Later, this road was extended to Nerchinsk. The Moscow Carriage Road became the main route to Siberia. Gold and fur were carried to Moscow along this road and it took care of the local mail and passenger traffic. Numerous convoys of exiles and convicts were driven to distant Siberia by this road.

The Ob was opened for navigation in 1843 and that greatly activized the intra-Siberian freight turnover and helped to settle the more distant regions.

Railway construction was started in Siberia in the late 19th century. The first railway, running from Sverdlovsk to Tyumen, was opened in 1885. Work on the great Trans-Siberian Railway was started in 1891 from two ends—in the west from Chelyabinsk and in the east from Vladivostok. In 1896, this line was brought up to Novosibirsk (formerly Novonikolayevsk), whose very foundation was linked up with the railway project. Towards 1905 there was a railway running across the whole of Siberia from the Urals to the Pacific.

At the close of the 19th century, after the abolition of serfdom, the attitude of the tsarist government towards migration to Siberia changed sharply under the influence of the growing peasant disturbances. It came to regard this migration as the cardinal means of reducing the rising agrarian crisis. Mass peasant migration to areas beyond the Urals began with the construction of the Trans-Siberian Railway. Nearly two million peasants went to live in Western Siberia in the period between 1896 and 1914. The steppe and forest-steppe regions of the West-Siberian Lowland and the foothills of the Altai were the quickest to be settled.

Siberian agriculture was drawn into the market turnover when

railways began to be built. Natural and semi-natural economy was replaced by commodity economy. Intensive settlement and land development was observed in the areas adjoining the railways. The railway gave access to a broad market both in the country and abroad for the sale of Siberian grain and meat.

The railways were chiefly responsible for the growth of the food and light industries that processed agricultural raw materials. Large flour-mills appeared, distilleries and breweries were enlarged and new tanning factories were built. But industrial development went no further than that. Siberia remained a raw-material colony.

Siberia's vast mineral resources lay undiscovered and untouched for ages. Peter the Great was the first to draw attention to them. A test smelting of silver ores was carried out on his orders in the Kuznetsk Ala-Tau. Coal was discovered in the Kuzbas in the 1720's. The Bachaty colliery began to function in 1851, and it was followed by the Kolchugin colliery in 1883. After the railway was built, the Anzhero-Sudzhensk coal deposits began to be worked in order to supply the railway and, partially, the towns. Gold began to be mined in Siberia in the mid-19th century, chiefly in the rich fields of the Kuznetsk Ala-Tau and the Aitai Mountains. It was extracted primitively and the main implements were the crow-bar, the pan and a barrel for washing the rock.

In spite of its natural wealth, Siberia was an economically backward region at the time the Revolution broke out. It exported gold, fur and agricultural produce, while products of the processing industry were brought from European Russia.

The October Revolution ushered in a new stage in the development of Siberia's productive forces. It developed from an agrarian-raw-material semi-colony into one of the leading industrial regions of the country.

Swift economic transformation gave rise to a new industrial geography of this vast and rich region. Heavy industry became the leading branch of the economy. Important seats of industry sprang up not only along the railway but also in the "backwoods," on the shores of the Arctic Ocean and in distant Yakutia.

The colossal mineral wealth allowed developing the mining and processing industry.

The coal industry began to play an important role in the Kuznetsk and Cheremkhovo basins. Large quantities of Kuznetsk coal are used locally by the thermal-power stations, while the coking coal goes to the Kuznetsk Iron and Steel Works. The ferrous metals industry of the Urals is, as we have already said, another major consumer of this coal. Collieries are being opened in many other places in Siberia.

The Siberian ferrous metals industry is, after the industry of the Urals, the second biggest in the Russian Federation.

Non-ferrous and rare metals are mined in the Trans-Baikal area, in Krasnoyarsk Territory and in Yakutia. The non-ferrous metals industry is growing rapidly and the plants that have already been built include the zinc works in Belovo, the aluminium factory in Stalinsk and the tin works in Novosibirsk.

Output of non-ore minerals is also growing. Large quantities of mica are yielded particularly by the Mama-Vitimsk, Slyudyanka and Aldan deposits, and graphite is mined in Kureika and in the East Sayan Mountains. This graphite goes to the Krasnoyarsk Graphite Works via the Yenisei.

Cement is also produced, while the timber and wood-working industries have been considerably enlarged.

Modern Siberia's high level of industrial development is shown best of all by the fact that a great variety of engineering factories have been built there.

Mining machinery (including mining combines, cutting machines, coal conveyers and wagonettes, and various mine equipment are produced in the Kuzbas towns, locomotives and carriages in Krasnoyarsk and Ulan-Ude, lathes in Novosibirsk, Tomsk and Kurgan, river vessels in Tyumen and Tobolsk, road and building machinery in Novosibirsk, Kurgan and Tyumen, boilers for thermal-power stations in Barnaul, farming machinery in Rubtsovsk, Omsk, Kurgan, Novosibirsk, Krasnoyarsk and Barnaul. The Altai Tractor Works in Rubtsovsk is one of the biggest in the Russian Federation and produces tens of thousands of tractors for agriculture in Siberia and other regions. The grain combines put out by the Krasnoyarsk Works are known throughout the country for their fine qualities.

Kuzbas industry rests on its own, local power resources. Big thermal-power stations are in operation in this area. Large thermal-power

stations are being erected in Tom-Usinskoye and in Belovo. When they are commissioned, the Kuzbas power system will become part of the integrated power grid of Central Siberia.

However, in Siberia's long-term economic development the chief role will be played not by thermal but by hydropower stations. Its industrial development demands a huge quantity of electric power and this power will come from the giant rivers with the mighty Yenisei at their head.

The time has arrived to put the colossal power of this mightiest of Russian rivers to use. The four-million-kilowatt Krasnoyarsk Hydropower Station, which will be the biggest in the world, is rising on the banks of the Yenisei. The river's channel will be blocked by a dam and the water will flood an extensive area forming the Krasnoyarsk Sea, which will be more than 400 kilometres long and 90 kilometres wide. Superpowerful hydroturbines with a capacity of 250,000-300,000 kilowatts each will be installed at the Krasnoyarsk Hydropower Station.

The first of the big Angara cascade, the Irkutsk Hydropower Station on the Angara, a tributary of the Yenisei, will soon be put in operation. Construction of the Bratsk Hydropower Station (3,600,000 kilowatts), which will be somewhat smaller than the Krasnoyarsk Project, is proceeding rapidly.

The Bratsk Storage Lake on the Angara will be bigger than not only many artificial reservoirs but also some seas. For example, the Sea of Azov is 15 metres deep at its lowest point, while the depth of the Bratsk Storage Lake will reach 100 metres. This storage lake will have seven and a half times more water than the Rybinsk Reservoir. Truly without equal, its enormous reserves of water will ensure the uninterrupted operation of all the sixteen powerful turbines of the Bratsk Development.

The building of this station will improve the conditions for navigation on the Angara, as the dangerous Shaman and Padun rapids will be eliminated.

The energy of these two great Siberian rivers will contribute towards the establishment of a new Angara-Yenisei industrial region with huge, energy-consuming electro-metallurgical plants. Siberia

Yakut diamonds

First houses of the town of Mirny, the centre of the recently developed diamond industry in the Yakut taiga

View of Koryak Volcano, Kamchatka

will be able to push ahead the development of its coal, mineral, gold and diamond wealth. New industrial centres will grow up.

Siberia's plan of electrification is not restricted to the construction of the Bratsk and Krasnoyarsk hydropower stations. This plan provides for the building of big power stations on the Ob and the Irtysh in Western Siberia and the creation of an integrated power grid in Central Siberia.

Development of the heavy industry has facilitated the task of building up various branches of the light industry in Siberia—textiles, foot-wear and leather.

Cotton mills operating on Central Asian cotton have been built in Barnaul, Novosibirsk and Kansk. There are textile and knitted-wear mills in Novosibirsk, Omsk and Kurgan.

The food industry, primarily butter- and cheese-making, is expanding rapidly in Siberia. Many large flour mills and meat-packing plants have been built. The fish industry is playing a prominent role in Eastern Siberia.

One of the biggest bread-baskets of the Soviet Union, Siberia produces grain for many regions in the country. In 1956, Siberia accounted for nearly half of all the grain procured in the Russian Federation. This became possible thanks to the development of huge tracts of virgin and disused land.

Modern farming methods, evolved mainly with the assistance of the Siberian collective-farm scientist Terenty Maltsev,[1] are being used in Siberia.

Large-scale irrigation work is under way in Siberia. The big storage lake on the Ob, which is being constructed as part of the Novosibirsk Hydropower Development, will irrigate the steppe farming regions of Kulunda and Baraba in Western Siberia.

In Western Siberia animal-breeding is following a distinct beef and dairy pattern. Fine-fleeced and semi-fine-fleeced sheep are bred

[1] Terenty Maltsev suggested a new method of cultivating land, the essence of which is that fallow land is ploughed, without being turned over, once in four or five years in combination with surface cultivation in the years in between. The land is ploughed to a depth of 40-50 centimetres with the help of a special plough that does not turn the soil. This conserves the moisture and allows the soil to be better enriched with organic substances, thus making for greater yields.

in the forest-steppe and steppe regions of the Altai and of the Trans-Baikal area.

Siberia's economy has expanded considerably and has taken intricate shape as a result of energetic economic development and the setting-up of new production capacities. Siberia now falls into two distinct big economic regions—Western and Eastern Siberia with the Yenisei forming a border between them. Western Siberia consists of Altai Territory and Kurgan, Tyumen, Omsk, Novosibirsk, Tomsk and Kemerovo regions. Eastern Siberia is made up of Krasnoyarsk Territory (including the Khakass Autonomous Region), Irkutsk and Chita regions, the Tuva Autonomous Region and the Yakut and Buryat autonomous republics.

Western Siberia stands out as an important region of the coal and chemical industries, power engineering, and ferrous and non-ferrous metallurgy. Both industrially and agriculturally, it is better developed than Eastern Siberia and is a major supplier of wheat, butter, meat and wool in the Russian Federation.

Eastern Siberia plays an important role in the output of gold, rare metals, tin, mica, graphite and fur. At the same time the heavy industry has a great future in this area because development of the enormous hydropower resources of the Yenisei and the Angara has been started.

Growth of Siberia's industry and agriculture is closely linked with the work of the transport system, which is of tremendous importance in view of the vast distances that have to be covered.

The Trans-Siberian Railway, the longest in Russia, runs in a latitudinal direction from the Urals to the Pacific Ocean. This is the backbone of the transport system in Siberia. Where traffic is heaviest, the line has been electrified. By 1960, this railway will be electrified all the way from Moscow to Lake Baikal.

Diesel haulage is being employed on a growing scale on Siberia's railways.

The Turkestan-Siberian Railway connects Siberia with Central Asia, while the Trans-Kazakhstan Railway, running due south from Petropavlovsk, brings Siberia into contact with Kazakhstan. In 1950, the Trans-Kazakhstan Railway was extended to the south of Lake Balkhash and joined up with the Turkestan-Siberian Line at the

railway station of Chu. This gave Western Siberia a better means of communication with Southern Kazakhstan and the Central Asian republics. The recently constructed South-Siberian Railway, known as the Yuzhsib, was a large contribution towards extending Siberia's economic ties with the Urals and with European Russia. It runs in a latitudinal direction, almost parallel with the Trans-Siberian Railway, to the west of Stalinsk and links up the towns of Barnaul, Kulunda, Pavlodar, Akmolinsk, Kartaly and Magnitogorsk. This railway passes through rich coal and iron-ore regions and through the farming areas of the Kulunda Steppe. It carries huge quantities of Siberian coal, timber, grain and metal to the central regions of Russia.

Another "trunk transport line"—the Tuimazy-Omsk oil pipe-line—was built in Siberia in recent years. This line pipes Volga-Ural oil to the Eastern areas. Siberia's network of oil pipe-lines will be considerably extended in the next few years, when oil will be piped to as far as Novosibirsk and Irkutsk.

The Trans-Siberian Railway crosses the largest rivers of Siberia (with the exclusion of the Lena), flowing in a meridional direction to the Arctic Ocean. All these rivers are navigable (the Yenisei for a distance of 3,000 kilometres, and the Lena—for 4,000 kilometres) and are used for the transportation of freight, particularly timber, fish, fur and agricultural produce. In the Extreme North of Siberia, where there are only two short railway branch-lines (Vorkuta-Salekhard and Dudinka-Norilsk), the waterways are of special importance. The Lena Basin is connected with the Trans-Siberian Railway by a new railway running from Ust-Kut to Taishet. Freight is carried along the Lena and its tributaries from Ust-Kut to the central regions of Yakutia and the gold-fields of Bodaibo and Aldan. Timber intended for export goes to Tixi Bay. It is also rafted down the Yenisei to Igarka and Dudinka and down the Ob to the port of Novy.

Timber and other exports are carried from all these ports via the Northern Sea Route, which provides cheap transport facilities for the vast natural wealth from the basins of the Ob, the Yenisei, the Lena and the Kolyma. From Arkhangelsk in the west, ships plying the Northern Sea Route carry freight for the Siberian North. This route is largely dependent on the polar weather stations distributed on it. Shipping is also aided by aircraft of the polar service.

The biggest of the Siberian towns are situated along the Trans-Siberian Railway. These are Kurgan, Omsk, Novosibirsk, Krasnoyarsk, Irkutsk, Ulan-Ude and Chita. The exception is the group of Kuzbas towns (Kemerovo, Stalinsk, Prokopyevsk, Anzhero-Sudzhensk and Leninsk-Kuznetsky), which, like the towns of the Altai (Barnaul and Biisk), are served by the southern branches of this line. Another branch runs northward to Tomsk.

Novosibirsk is the economic and cultural capital of Western Siberia. One of the youngest of the pre-revolutionary towns of Siberia, it had 887,000 residents in 1959. It was founded in 1893 on the right bank of the Ob at the junction of the Altai Railway (which later became part of the Turkestan-Siberian Railway, known as the Turksib) with the Trans-Siberian line. This is one of Siberia's chief transport cross-roads and one of the central airports of the Trans-Siberian Airway. Machine-building, metallurgical and chemical plants take care of most of Novosibirsk's industrial output, but the town also has numerous factories producing consumer goods: foot-wear, knitted-wear, leather articles and clothes. Novosibirsk is very important as a cultural centre. It has nine institutions of higher learning, the West-Siberian branch of the Academy of Science, and research establishments. The town is famous for its theatres, especially for its opera and ballet theatre.

Siberia's rapidly expanding economy and the tasks of further studying its natural wealth and ways of developing it have given rise to the need of establishing a Siberian branch of the Academy of Science. This branch has been organized in Novosibirsk, where at present an academic township embracing 13 research institutes is being built. The Siberian branch of the U.S.S.R. Academy of Science has research institutes in Irkutsk, Yakutsk, Krasnoyarsk, Vladivostok and on Sakhalin Island.

Many changes have taken place in the Yenisei Basin since the October Revolution.

The biggest economic and cultural centre on the Yenisei is the city of Krasnoyarsk, which is situated where the Trans-Siberian Railway crosses this great river. Krasnoyarsk has changed beyond recognition and in the past 30 years its population has increased many times over, reaching a total of over 400,000 people. A new dis-

trict with metallurgical, engineering, timber, chemical, light and food industries has been added to the city on the right bank of the Yenisei.

A great deal of electric power is needed to promote the further development of industry in the city and of the economy of the entire huge Krasnoyarsk Territory. That electricity will be supplied by the Krasnoyarsk Hydropower Station.

New industrial centres and towns (Abakan, capital of the Khakass Autonomous Region, and the mining town of Chernogorsk) have sprung up along the Yenisei. On the banks of the Yenisei in the polar tundra stands the new town and port of Igarka. The river is so deep there that though Igarka is situated nearly 700 kilometres from the sea, ocean-going vessels come right up to its moorages. The port of Dudinka and the town of Norilsk have appeared north of Igarka, close to the Kara Sea. Dudinka is linked up with Norilsk by the world's northernmost railway.

Lying in the heart of Siberia, Irkutsk Region, which has the greatest prospects as regards the development of the productive forces, is being rapidly industrialized. The commissioning of the Angara hydropower stations will give rise to the Baikal-Cheremkhovo and Bratsk power-industrial regions that will draw upon the same power and raw-material resources. That will enable the factories in these regions to cut down production costs to the minimum.

In Irkutsk Region, swift economic development is accompanied by the building of new towns. One of them is the handsome, modern town of Angarsk. It has a big Palace of Culture and other large buildings. Another town, Bratsk, is rising on the right bank of the Angara, near the giant power station that is being built there.

Irkutsk itself is expanding steadily. Transformation of the region's economy has brought about new conditions for its economic and cultural development. New factories have been erected in the town itself and in its suburbs. Most of these are on the left bank of the Angara, which cuts across the town. In addition to metal-working plants, which occupy chief place in Irkutsk's economy, there are quite a few enterprises of the food and light industries. Irkutsk's conversion into a major industrial and cultural centre of Eastern Siberia is facilitated by its advantageous location on the Trans-Siberian Railway and on the airway from Asia to Europe.

The population of Irkutsk is increasing rapidly (there were 314,000 inhabitants in 1956). Housing construction is proceeding apace, new parks and squares are being laid out and trees are being planted in the streets and squares.

Besides the university Irkutsk has six other institutions of higher learning and the East-Siberian branch of the Academy of Science.

Another feature of Siberia's transformation is that great changes have taken place in the development of the productive forces of its Extreme North.

Much has been done to raise the economic and cultural level of the indigenous Siberian peoples: the Yakuts, the Tunguses, the Evenks, the Nentsy and others. In tsarist times, these peoples were regarded as savages. After the Revolution, they became equal members of the family of peoples of Soviet Russia, received their national autonomy and were restored to a new life.

The Yakut Autonomous Republic is the biggest of the national-territorial unions of the North. It occupies an area of more than three million square kilometres and is inhabited by nearly 500,000 people; that is, only 16 inhabitants per 100 square kilometres. Yakutsk, capital of the republic, is 7,744 kilometres from Moscow. This region's great wealth includes gold, diamonds, mica, coal and fur. The building of wooden boats and other industries are being developed. Ships ply the Lena, the Aldan, the Vilyui, the Yana, the Indigirka and the Kolyma.

Cultural development was promoted on a big scale in Yakutia in Soviet years. The republic has numerous schools, clubs and hospitals, and a galaxy of Yakut writers, artists and scientists have appeared.

The Taimyr, Evenk, Yamalo-Nentsy and Khanty-Mansi national districts are in the basins of the Yenisei and the Ob west of Yakutia. Reindeer-breeding, hunting, and fishing (including a fish-canning industry) play an important role in the economy of these districts. At the same time, the mining and coal industries are expanding rapidly, thanks to the great natural wealth. The centre of these industries is Norilsk, the biggest town within the Arctic Circle.

The construction of a big town like Norilsk, with comfortable, multi-storeyed buildings and asphalted streets, in the zone of eternal congelation was an exceptional feat in the practice of town-building.

A new method of building foundationless houses is being applied there. Special reinforced-concrete structures are driven into the soil and these, freezing to the soil, create a reliable support for the houses.

The population of Siberia exceeds 19 million people, and of these 85 per cent are Russians and Ukrainians. Russian settlements are strung out along the Siberian rivers and reach the Arctic Ocean far in the north.

Formerly, the Russians inhabiting Siberia used to be divided into two groups: old-timers and new settlers. The old-timers were the descendants of the conquerors of Siberia and the old settlers, who arrived prior to the building of the Trans-Siberian Railway, while the newcomers were the people who came to Siberia during the mass migration that was undertaken after the railway was built. Through mixed marriages, the Siberian old-timers of a number of regions outwardly resemble the local indigenous population. The Russian old-timers in the Tobol North resemble the Ostyaks, and on the Lena—the Yakuts, while the old-timers around Lake Baikal can hardly be distinguished from the Buryats.

The southern part of Siberia has a population which in addition to Russians consists of Altaians, Khakassi, Tuvinians and Buryats. The Buryats have an autonomous republic (the chief town is Ulan-Ude), and the Khakassi, Altaians and Tuvinians have autonomous regions.

Within the next few years Siberia will become an even more powerful industrial region with an all-sidedly developed economy. It has all the requisites for this: incalculable wealth of minerals, forests and water power. An important feature is that there are mineral and other natural resources in many places in Siberia, thanks to which it is easier to distribute industry uniformly and to establish a complex economy in various regions of this vast territory.

THE PACIFIC SEABOARD

The vast economic region known as the Soviet Far East, which embraces an area of more than 3,100,000 square kilometres, is situated in north-east Asia, along the shores of the Pacific Ocean. Its northernmost tip juts into the Arctic zone, while in the south it comes down to the latitude of Central Italy. Its extreme north-eastern point,

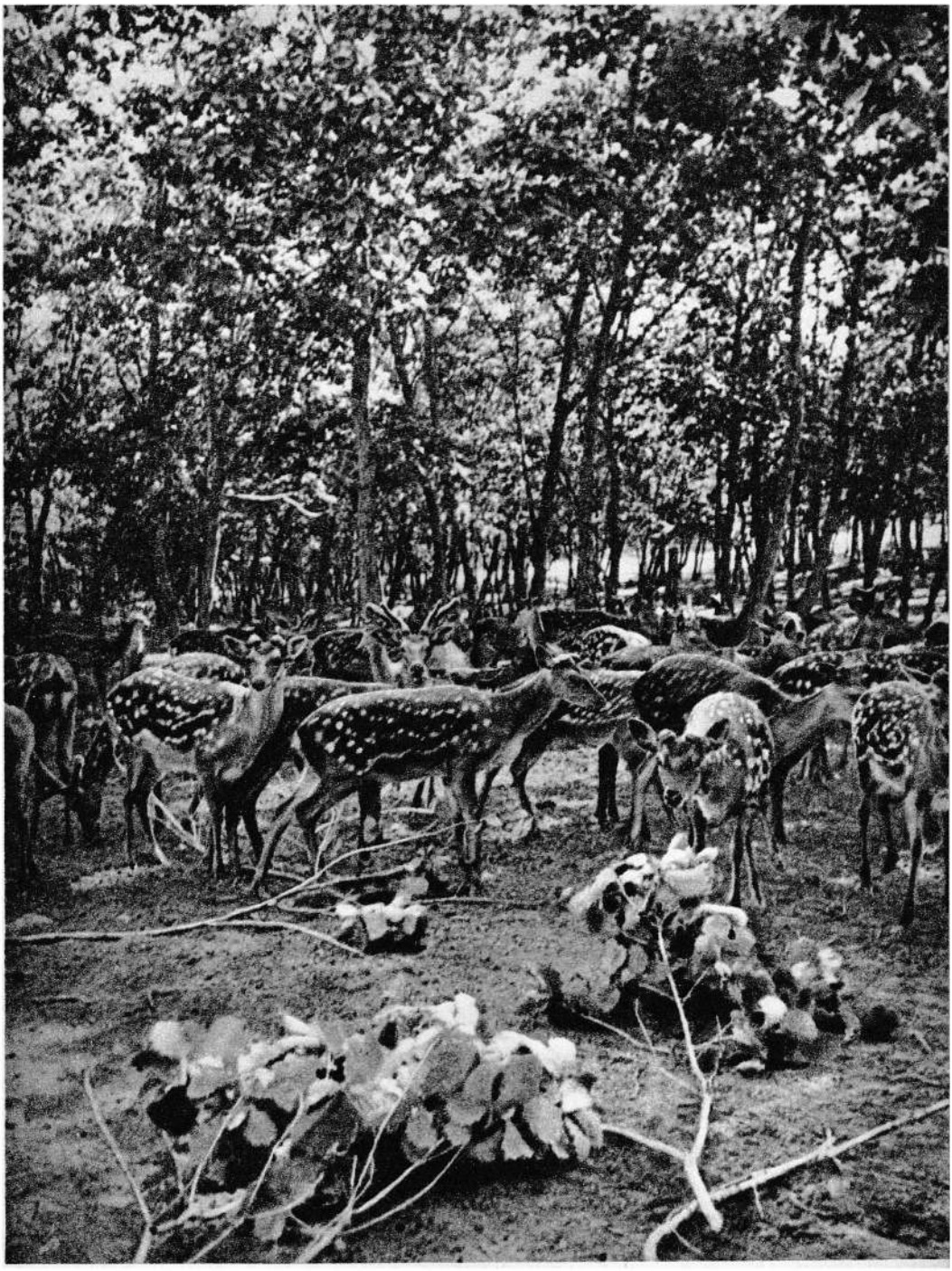
Cape Dezhnev, is nearly 4,000 kilometres away from the southernmost town of Posiet.

The natural conditions of the Soviet Far East, its landscape, flora and fauna are extremely varied and unusual.

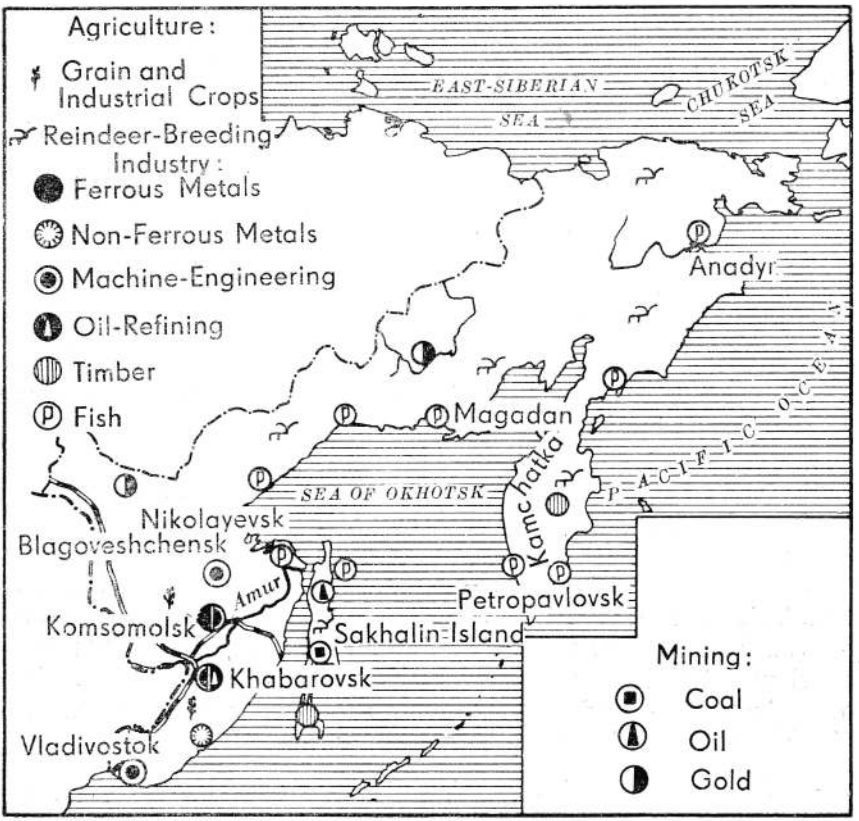
Mountains cut up this entire territory and they include the Stanovoi, Jugjur and Sikhote-Alin ranges and the mountains of Kamchatka, Sakhalin and the Kuril Islands. Mount Klyuchevskaya, which is 4,850 metres above sea-level and is the tallest active volcano in the Eurasian continent, stands on the eastern shore of Kamchatka. The other volcanoes along the eastern coast of Kamchatka are from two to over three thousand metres above sea-level, while the elevation of the volcanoes on the Kuril Islands exceeds 1,500 metres. Together with Kamchatka, the Kuril Islands are part of the Pacific ring of volcanoes. Of the more than 200 volcanoes on the Kuril Islands and in Kamchatka, 60 are active. The volcanoes harbour inestimable reserves of heat and hot springs and steam gushers dot the landscape. These heat resources are the base for developing geothermal power engineering in the Soviet Far East. The first experimental geothermal-power station is already being planned in Kamchatka. The earth's heat energy will also be used for heating towns and creating hothouses and hotbeds for the local farms.

Great deposits of minerals took shape in the course of the Soviet Far East's geological history. There are large deposits of coal. The high-grade anthracites and semi-anthracites are found amidst the Mesozoic accumulations in the basin of the Bureya River. Other important coal deposits have been discovered around Vladivostok, on Sakhalin Island and in Kamchatka.

Oil deposits are connected with Tertiary sedimentary rocks. Sakhalin Island is the chief oil region of the Soviet Far East. An abundance of lead, zinc and tin with an admixture of silver occur in the mountains of the Sikhote-Alin Range. Four mines extracting this wealth have been built in Tetyukha. Deposits of non-ferrous metals have been discovered in other regions of Primorye Territory as well. The Soviet Far East is one of Russia's leading producers of gold. The gold-fields in the basins of the Kolyma, the Zeya and the Selemja are especially important. In Soviet years, the gold industry was equipped with modern machines and the fields were enlarged, and



A young woman hunter from Khabarovsk Territory



that accelerated its development. The gold output has trebled in the past ten years.

The rivers of this territory represent unbounded reserves of "white coal." The most outstanding of these rivers is the Amur, one of the biggest in Asia. It is nearly 3,000 kilometres long. In its upper reaches, the Amur is a typical fast mountain river, but from the point where it receives the waters of the Zeya it widens out considerably and grows calmer. The waters of the Amur again become tempestuous where they cross the mountains of the Little Khingan, but they calm down again in the Sungari-Ussuri-Amur Hollow.

The Amur is dangerous for its destructive floods. Shallow during the long autumn and winter months, the river rises during the summer monsoons. Torrential rainfall fills the river channel and the waters flood a huge area. There have been cases when the water rose to the level of a five-storey house. During one of the floods, a ship sailed down the main thoroughfare of Blagoveshchensk. Floods cause enormous damage to the densely populated farming regions in the valley of the Amur and its tributaries.

The subjugation of the Amur is one of the major national-economic problems of the Soviet Far East. The investigations conducted by Soviet scientists showed that the floods can be eliminated by building large storage lakes primarily on the Amur's tributaries—the Zeya, the Sungari and the Ussuri, and on the Upper Amur. The construction of these storage lakes will allow regulating the water-level in the Amur, making the river more navigable and building a number of hydropower stations on it. Several projects providing for an improvement of the conditions for transport on the Amur have been worked out. One of them envisages connecting the lower reaches of the river with the Tatar Straits by means of a deep, 15-kilometre canal. This canal would enable sea-going vessels to enter the Amur, by-passing its shallow mouth. Another project is a canal linking the Ussuri up with the Japan Sea in the region of Vladivostok. These two projects aim at giving the Amur additional outlets to the sea, which would be of tremendous economic importance.

Nearly half of the gigantic Amur Basin (an area of more than 1,800,000 square kilometres) is in the Chinese People's Republic. The Chinese started developing enormous tracts of land along the river long ago. The friendly relations between the Russian and Chinese populations on either bank of the Amur are of long standing. For example, the so-called Zheltuga Republic, formed by Russian and Chinese gold-prospectors with an elective self-government existed for several years in the upper reaches of the Amur back in the 1880's.

The floods, of course, show no mercy either to the Russian or the Chinese regions. In the conditions obtaining today, it is quite natural that problems connected with harnessing the Amur are being decided jointly by the two friendly socialist peoples. The academies of science of the two countries have signed an agreement on joint work with

regard to all the problems connected with developing the productive forces of the Amur Basin.

The Amur teems with fish, of which there are nearly 90 species. Fish are also plentiful in the other rivers of the Soviet Far East, particularly in the seas washing its shores. The Soviet Far East is the world's biggest producer of crab-meat. The fin-footed animals—seals, walruses, Steller's sea-lions, northern fur seals, as well as the sea-otter—that live there are of great importance. Many kinds of whales are also caught in these waters.

The Soviet Far East is extremely rich in fur-bearing animals, which live in the boundless Far-Eastern taiga and in the tundra. Of the more than 60 species of animals inhabiting the taiga forests, the most valuable are the sable, the polar fox, the ermine, the kolinsky, the otter and the silver fox.

Large-scale hunting is carried on in the Kamchatka Peninsula, which yields three-quarters of the Soviet Far East's fur. This is one of the main sable regions. There are many fur-bearing animals in Chukotka as well. The polar fox is the chief animal hunted there. The squirrel, a very fecund little animal, is hunted almost throughout the whole of the Soviet Far East. Tigers occur in the taiga in the valley of the Ussuri. The Ussuri tigers are famous for their size.

Many state fur farms have been established in the Soviet Far East to breed valuable fur-bearing animals. There are state preservations which play an important role in preserving fur-bearing animals.

In the Soviet Far East hunting is strictly regulated and carried on according to plan, and for that reason the number of fur-bearing animals is always stable.

The Far-Eastern taiga is one of the major sources of timber in this territory. The predominant trees are the Ayan spruce (Picea jezoensis), the spruce and the Daur larch. The white birch and the fragrant poplar, a mighty tree with a cork-like bark, grow in the fir and spruce forests in the valleys. In the south, particularly on Sakhalin Island, the forests have an abundant admixture of southern species—the oak, the ash-tree, the linden and the maple. Thickets of Kuril bamboo are found on the western coast of Sakhalin Island. That is the only place in Russia where bamboo grows wildly.

There are numerous seashore colonies of birds throughout the

whole length of the Chukotka Peninsula, the Komandorskie Islands, Kamchatka and the eastern coast of Sakhalin Island.

The Russians were the first Europeans on the north-eastern seaboard of the Pacific Ocean and laid the beginning for the real development of its natural wealth.

Courageous Russian travellers reached the Pacific early in the 17th century. A handful of Cossacks commanded by Ivan Moskvitin appeared on the shores of the Sea of Okhotsk in 1639 in search of valuable furs. Soon an expedition headed by Vasily Poyarkov was fitted out for the Far East from Yakutsk. Passing along the entire length of the Amur and the Sea of Okhotsk, Poyarkov gave the first description of these places. Yerofei Khabarov went down the Amur in 1649-51. The first Russian winter colony, Albazin, was founded in the middle reaches of the Amur. At almost the same time, Mikhailo Stadukhin discovered the Kolyma River in the north and went overland to Anadyr for walrus tusks. The Cossack Semyon Dezhnev sailed round the Chukotka Peninsula in 1648, nearly 100 years before Bering, and discovered the straits between Asia and America. Today, on Cape Dezhnev on a high cliff overhanging the cold sea, there is a monument to this brave explorer.

In 1725-30 and in 1733-43, two expeditions headed by Vitus Bering, a Russian naval officer, were sent out after a plan conceived by Peter the Great. These were known as the First and the Second Kamchatka expeditions. One of the chief aims was to settle the question of whether there was a strait between Asia and America. Bering was the first after the forgotten Dezhnev voyage to pass through the straits between Asia and America and discover several islands in the sea and in the straits subsequently given his name. These expeditions left valuable descriptions of the northern and eastern coast of Siberia. Many of the participants perished, while Bering himself died of scurvy in 1741 during a difficult winter on islands later called the Komandorskie Islands.

The geographical discoveries of the 17th-18th centuries helped to extend people's knowledge of the Far East and attracted the attention of merchants and industrialists.

The Bering Expedition was the last big expedition dispatched to the Far East by the tsarist government. Individual explorers, how-

ever, did much to study this extremely rich region. The Pacific Ocean was a school for Russian sailors and the names of famous seafarers like Ivan Kruzenstern, Fyodor Litke, Ferdinand Wrangel, Gennady Nevelsky and others will remain for ever in the history of geographical discoveries. Perseveringly, enduring incredible hardships, hunger and cold, they blazed the trail into the unknown, mapped and joined to Russia new lands in the Far East, thus laying the ground for the development of their productive forces. The naturalist and explorer Alexander Middendorf described the north-eastern part of the Far East, while Academician Stepan Krasheninnikov described Kamchatka. The ethnography of the Far East was studied by Vladimir Tan-Bogoraz, Lev Sternberg and Vladimir Iohelson who lived there in exile. The best description of Far-Eastern flora was given by the geographer and botanist Academician Vladimir Komarov. The travellers Pyotr Kropotkin, Nikolai Przhevalsky and Vladimir Arsenyev made a large contribution towards the investigations in the southern part of the Far East.

The map of the Far East gives the names of Russian travellers, seafarers, scientists and explorers who helped to open up that territory. The town of Khabarovsk and Yerofei Pavlovich, a station on the Trans-Siberian Railway were named in honour of the Cossack Yerofei Pavlovich Khabarov. Vitus Bering's name is borne by the Bering Sea, the Bering Straits and one of the Komandorskie Islands—Bering Island. Wrangel's name has been perpetuated in the name of an island in the Arctic Ocean. Nevelsky's name was given to the narrow part of the Tatar Straits and to one of the mountains in North Sakhalin. The extreme north-eastern cape of Asia bears the name of the Cossack Dezhnev.

By the Treaty of Aigun in 1858, the left bank of the Amur and its right bank east of its confluence with the Ussuri passed to Russia, and in 1860 Russia came into possession of the whole of Primorye in accordance with the Peking Treaty.

This was about the time when migration to the Far East began on a large scale.

Many of the people desiring to settle there had to push their way across the whole of Siberia, carrying their families and property on horses. This was an extremely long journey, lasting several years.

Part of the settlers did not reach their destination, building homes along the way, while quite a few perished en route or during the first years in the new place. The stream of settlers was particularly big after the defeat of the first Russian Revolution of 1905-07. Disappointed in their hopes of receiving the land of the landlords, the poor peasantry moved to the new lands in search of a better life.

Throughout the period of migration, the Primorye Territory and the Amur area attracted two and a half times more settlers than all the other regions of the Far East. In the southern part of the Far East, the settlers ploughed up virgin land, reclaimed marshes, cleared forests and built roads and villages. The North of the Far East remained an uninhabited outskirt of tsarist Russia. Kamchatka was a symbol of backwardness and remoteness. Sakhalin Island and the Amur Area were converted into hard-labour prisons. The convicts built a carriage road from Blagoveshchensk to Khabarovsk and the Amur Railway.

Prior to the October Revolution, the Far East was wholly dependent on the industrial centre of Russia. In that territory economic development was limited to the building of outposts and administrative centres and the construction of a strategic railway. The natural wealth was worked rapaciously. Most of the gold, fish, fur and timber from this area was exported. The processing industry developed slowly and was represented by flour mills and small breweries and distilleries. Agriculture could not meet the requirements of even the local population.

Socialist construction transformed the economic pattern of the Soviet Far East. The extracting and the processing industries made rapid headway on the basis of the local natural wealth.

The fishing industry is one of the leading branches of economy in the Soviet Far East. This territory is the Russian Federation's second biggest producer of fish, the catch including crabs and sea mammals. Nearly two-thirds of the republic's fish industry is concentrated there. Complex utilization of all the fishing-grounds has radically changed the character of the catch. In the past, the fishing industry was based mainly on salmon and herrings caught in the rivers (chiefly in the Amur) and along the coast where big outlays were not required. This led to a rapacious extermination of fish on their way to the

spawning-grounds. At present, the Soviet Far-Eastern fishing industry is concentrating mainly on the sea. The hunting of sea mammals has acquired great importance. The Aleut Whaling Flotilla has been operating in the Far East since 1932.

On the coast and on the seas of the Far East there are now stationary and floating canneries that process the catch. The Soviet Far Eastern fishing industry has received a big fleet of refrigerator ships.

As we have already said, the Soviet Far East is one of the country's most important producers of gold and non-ferrous metals.

The territory's other mineral resources are used chiefly to meet local requirements.

A fuel and power economy based on great reserves of coal and oil has been established in the Soviet Far East. Coal is mined primarily in Primorye (Suchan, Artem and Tavrichanka) and also in Kivda-Raichikhinsk District, Amur Region, on Sakhalin Island and in the Bureya Basin. In the North, coal is mined along the Upper Kolyma and in Korf and Ugolnaya bays.

Oil-extraction is concentrated on Sakhalin Island, where the oil town of Okha has been built. The big Katangla, Ekhabi and other oil-fields have appeared to the south and north of this town. The oil from Okha is sent to Khabarovsk where it is refined.

The Amurstal Works was built in Komsomolsk to meet the growing metal requirements of this area's engineering and other industries.

The fishing, coal, oil and ship-building industries require large quantities of cement and timber. A big timber industry has risen in the Soviet Far East on the basis of the great forests in that area. In former times, timber-felling was concentrated in Primorye, chiefly near Vladivostok and along the Ussuri River, but today timber is felled also on Sakhalin Island, in the basin of the Amur and in the north-eastern part of the Sikhote-Alin Mountains. Numerous workers' settlements have been built deep in the taiga forests. The new enterprises there include large wood-working plants, more than a hundred sawmills, furniture and plywood factories.

The Soviet Far East is now an important industrial region. Industry, which accounts for nearly three-quarters of its output, plays the leading role in this territory's economy.

The creation of a local food base is of great importance. Considerable areas of new land have been developed. In 1956, the crop area extended over nearly 1,800,000 hectares. The lop-sided development of farming has been eliminated. In the past nearly half of the crop area was sown to oats, which was considered the least capricious of crops, but today wheat has moved into first place, followed by oats and rice. The importance of industrial crops such as soya-beans, sugar-beet, flax and plants yielding oil for the lacquer and paints industry, and of potatoes and other vegetables has risen considerably.

Beef- and dairy-farming is carried on in the south of the Soviet Far East with its extensive meadows and rich pastures of the Zeya-Bureya and Amur valleys, the Khanka Plain, and the valleys of the Ussuri and other rivers. State pedigree farms have been established here with model pig and dairy farms. Dairy-farming is developing in the suburban areas and in the north to satisfy the needs of the local population. Sheep and horses are bred in the mountainous regions. The reindeer is bred in the tundras of the North and the spotted deer in the South.

The extensive coastline of the Far East has made the water transport the chief means of communication in this region. Absolutely devoid of railways, the entire northern part of the territory is linked with the more developed south exclusively by sea. Shipping has been organized between Vladivostok and Petropavlovsk, Vladivostok and Alexandrovsk, and Vladivostok and Nogayevo. The Northern Sea Route plays a tremendous role in developing the productive forces of the Soviet Far East. Navigation on the Amur and the Ussuri is likewise important, and there is quite heavy local shipping on the rivers of the North.

The Trans-Siberian Railway passes along the southern part of the Soviet Far East, linking up the European part of the R.S.F.S.R. and Siberia with the Far East and the foreign countries of the Pacific. The second line of this railway was laid in recent years, and a number of branches have been built, particularly the important branch line from the station of Volochayevka to Komsomolsk.

North of the Trans-Siberian Railway there are virtually unbounded mountain and swamp and taiga expanses through which it is planned to build the new Baikal-Amur Railway with a direct outlet to the

Pacific Ocean. In many of the northern regions, particularly in the out-of-the-way areas, the only means of communication are the rivers and reindeer- and dog-sledges.

Aircraft, which have penetrated into the remotest points of the Soviet Far East, are making it possible to organize rapid communication between separate parts of this vast land. There are now regular passenger and mail air services between Khabarovsk and Petropavlovsk, Khabarovsk and Sakhalin Island, and Khabarovsk and Vladivostok. Aircraft have now become a part of life in the Soviet Far East. Motor roads have been built across the Kolyma Mountains and in other regions.

The Soviet Far East consists of Khabarovsk and Primorye territories and Amur, Magadan, Kamchatka and Sakhalin regions.

Khabarovsk, one of the biggest towns of the Soviet Far East with a population of 280,000 people, is the economic and administrative centre of Khabarovsk Territory. Its industrial growth is expedited by its convenient transport and geographical situation. It has shipbuilding yards and an oil-refining industry that works on Sakhalin oil. In the town there are institutions of higher learning, technical and general educational schools and a number of research establishments, including the institutes of forestry, agriculture and animal-breeding and a branch of the Pacific Institute of Ichthyology and Oceanographic Research. Four theatres are operating in Khabarovsk.

The town of Komsomolsk, built deep in the taiga by Komsomol enthusiasts in 1932, arose with fabulous speed. Seeing the handsome buildings of this big, modern town with 170,000 residents, it is hard to believe that the first century-old cedar fell here to the blows of an axe only recently. Komsomolsk's numerous factories produce metal and machines. A railway connects the town with Sovietskaya Gavan (a port in the Tatar Straits) and with Khabarovsk.

The Jewish Autonomous Region, founded in 1934 on the basis of the former Birobijan National District, is part of Khabarovsk Territory. It was founded with the purposes of meeting the desires of working Jews to engage in agriculture in one of the rich areas of the Soviet Far East.

Vladivostok, the large Pacific port of the Soviet Union and the chief town of Primorye Territory, occupies the shore of Zolotoi Rog

Bay. The blocks of houses are arranged on mountain slopes forming a steep amphitheatre round the port, creating the impression that they stand on top of each other. This is a busy town with fine buildings, big shops and modern hotels. Vladivostok is not only a trading port but also an important industrial centre with developed engineering and fishing industries. Vladivostok's rapid development as an important port on the Pacific, as the gates to the countries of South-East Asia and America, and its industrial growth have had an effect on the town's cultural life. It has a university, a polytechnical, fishing and teachers institutes, and a higher nautical school. Among the scientific establishments in the town, the most outstanding are the Far-Eastern branch of the U.S.S.R. Academy of Science and the Pacific Institute of Ichthyology and Oceanographic Research. In the town there are four theatres, three museums and a philharmonic society.

Another interesting Soviet Far-Eastern town is the new regional centre of Magadan, which is situated in the Bay of Nagayev on the shore of the Sea of Okhotsk. It grew rapidly as a result of the development of the gold industry along the Kolyma.

The town and important port of Nakhodka stands on the shore of the once-deserted Nakhodka Bay in the Japan Sea.

Petropavlovsk-Kamchatsky, the administrative centre of Kamchatka Region, is expanding swiftly. Kamchatka is the country's chief fishing-area, the fishing industry accounting for more than four-fifths of its output. A glance at an economic map of Kamchatka will show us that its south-western and north-eastern coast is strewn with dots, each of which stands for a fishing combine or a fish-cannery. Hunting, whaling, timber-felling and metal-working play an important role in the economy of Kamchatka.

The Soviet Far East is a land with a great future. Its economy is expanding from year to year, new towns are springing up and the cultural level of its peoples is rising.

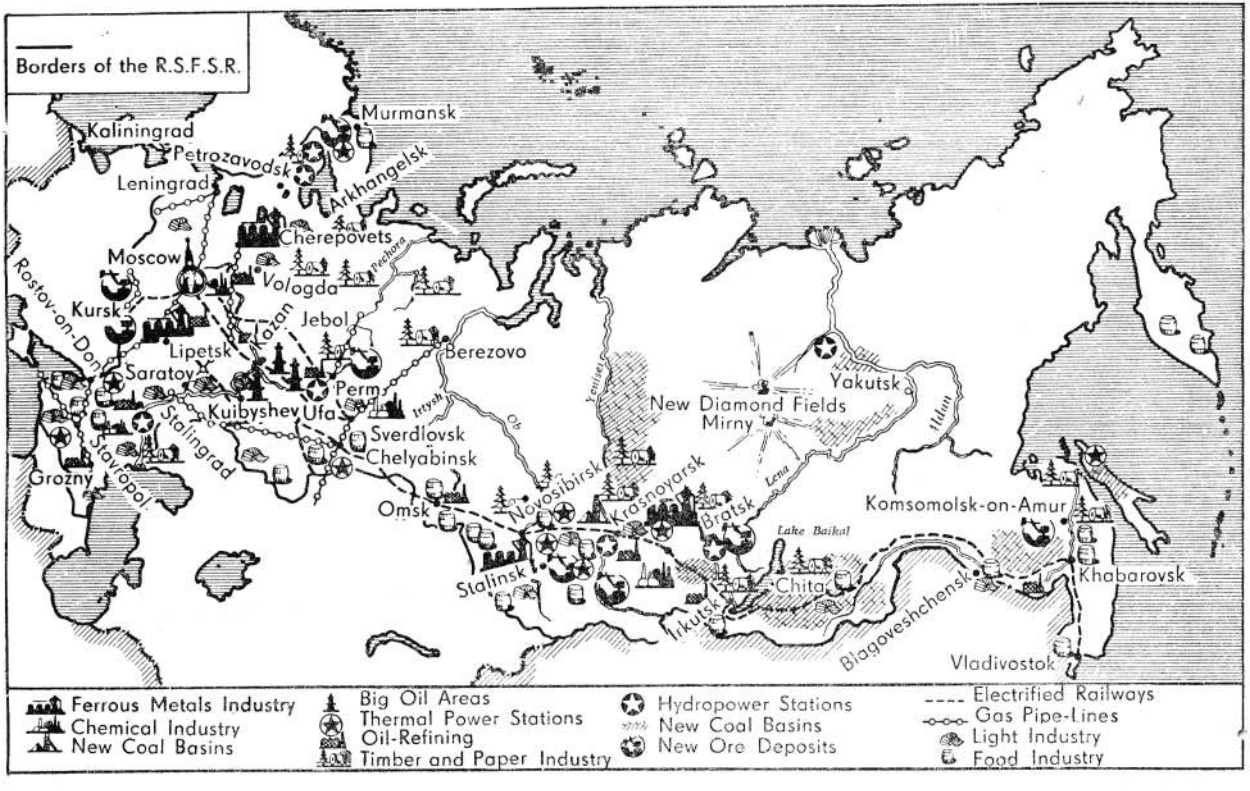
One of the most important tasks in further promoting the productive forces of the Russian Federation and of the whole of the Soviet Union is to accelerate the development of the natural resources of the eastern regions.

IMMEDIATE PROSPECTS OF DEVELOPING THE PRODUCTIVE FORCES OF THE RUSSIAN FEDERATION

As of the entire Soviet Union, the economy of the Russian Federation has entered a new stage of its development. The 21st Congress of the Communist Party of the Soviet Union, held in 1959, approved the target figures for the country's economic development in 1959-65, which are components of the long-term general plan for the next 15 years. A considerable part of the general plan will be carried out in the next seven years.

The 1959-65 targets envisage a further all-sided cultural and economic upswing of the republic. In the Russian Federation, total industrial output will increase by approximately 80 per cent. The leading branches of the heavy industry will be substantially enlarged. Output of pig iron will grow by 69-84 per cent, steel by 60-69 per cent, aluminium by about 200 per cent and electric power by 100 per cent.

Oil and natural gas are getting a great deal of attention. The development of the newly-opened oil deposits in Tataria, Bashkiria and the Volga Area is being pushed ahead. Several new oil-refineries and long oil pipe-lines will be constructed. Essentially speaking, a new oil-refining industry will be set up in the North-West, the Centre and Eastern Siberia. Promotion of the oil and gas output will further strengthen the country's power resources. Gas is an additional source not only of fuel but of raw materials for the chemical industry, which is expanding at a particularly rapid pace. Within the next seven years, the Russian Federation will increase its output of chemical fibres by 200-220 per cent, synthetic rubber by 160



Distribution of New Industries Under the 1959-65 Plan

Floating crab-canneries in the Bay of Vladivostok

Catch of white whales on the shore of the Sea of Okhotsk in Khabarovsk Territory

Seal colony in Kamchatka

per cent, plastics and synthetic tars by more than 400 per cent, and mineral fertilizers by 160-180 per cent.

The target figures provide for a considerable rise in the output of coal and cement as well as the development of the timber and woodworking industry. The engineering industry will forge far ahead. The light and food industries will make swift progress. For example, the sugar output will increase by more than 200 per cent.

The expansion of all branches of industry is being ensured by the growing and strengthening raw-material resources of agriculture. The next seven years will witness a substantial rise in the output of grain, sugar-beet, oil-seeds, flax-fibre, vegetables (including potatoes), meat, milk, eggs, wool and other products. Each region is developing the branches of agriculture for which it has the most favourable natural and economic conditions.

One of the major tasks is to achieve a far-going advance in agriculture in the non-chernozem belt, the creation of a sugar-beet base in the Kuban area, an extension of the output of oil-bearing crops in the east and south-east of the Russian Federation and the implementation of several other measures to facilitate a more rational distribution and development of agricultural production. The target figures provide for the further specialization and comprehensive development of large individual parts of the Russian Federation such as the European part, the Urals and Siberia.

In the European part of the Russian Federation the main attention is being devoted to developing the oil and gas industry of the Volga Area and the Northern Caucasus. Huge pipe-lines will be built to carry oil from the North Caucasus to Leningrad. Extension of the oil and gas output will allow reorganizing the fuel pattern and stopping the transportation of coal over the thousands of kilometres separating the European part of the Russian Federation from the Kuzbas and Karaganda. Greater use will be made of the hydropower resources of the Volga following the commissioning of the Stalingrad Hydropower Station.

Broad prospects are opening up for the regions of the Centre, where development will embrace the fabulously rich iron-ore deposits of the Kursk Magnetic Anomaly, which are able to supply the country's entire metallurgical industry with iron ore for hundreds

of years. The Cherepovets Iron and Steel Works will be completed and the Lipetsk Works will be extended within the next seven years. A large number of new chemical enterprises are being built.

There will be a further growth of the ferrous and non-ferrous metals, chemical, engineering and other branches of the heavy industry in the Urals, which is the leading industrial centre of the Russian Federation. The biggest ore-concentrating factory in the country will be put in operation in Kashkanar. Gas pipe-lines will be stretched to the Urals to strengthen the fuel and power resources in that area. The oil output in the Urals will be doubled. Gas and oil are raw materials for the output of new kinds of synthetic rubber and products of organic synthesis.

The timber and paper-and-cellulose industries will be expanded in the European North.

The new features of such rich regions of Russia as Siberia and the Soviet Far East are taking distinct shape. Their inestimable natural wealth will be broadly developed in the course of the next seven years. Power industry giants and big industrial and cultural centres are already rising. Two big iron and steel works will be built in Siberia in the coming seven years. They will form the basis of the Soviet Union's third metallurgical base. In 1965, Siberia and the Soviet Far East will be producing 181-186 million tons of coal, 40 per cent of which will be obtained through open-cast mining. Cheap coal will be used in the big thermal-power stations that are going to be built.

The world's biggest hydropower station with a capacity of more than 3.5 million kilowatts will be commissioned at Bratsk. At the same time, construction is starting on the Krasnoyarsk Hydropower Station, which will have a capacity of over four million kilowatts.

Oil pipe-lines are extending into Siberia and they will carry the raw material for the big oil-refineries now under construction. A huge paper-and-cellulose industry is being set up anew in Siberia. The timber and wood-working industries are making rapid headway. Other industries are also expanding.

Yakutia will be transformed into one of the world's biggest producers of diamonds.

Transportation facilities are being improved in Siberia and the

Soviet Far East. New railways will be built and the Trans-Siberian Railway will be electrified.

Superiority in rates of development has always been the advantage of the socialist system of economy. Within the next 15 years, the Soviet Union will move into first place in the world not only for the volume oi output but also for output per head of population. The U.S.S.R. will have the material and technical base of communism, which will at the same time signify a major triumph in the economic competition with the leading capitalist countries.

The Russian Federation, the leading among the 15 equal republics of the Union of Soviet Socialist Republics, will play an important role in this unprecedented advance.